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FOR THE

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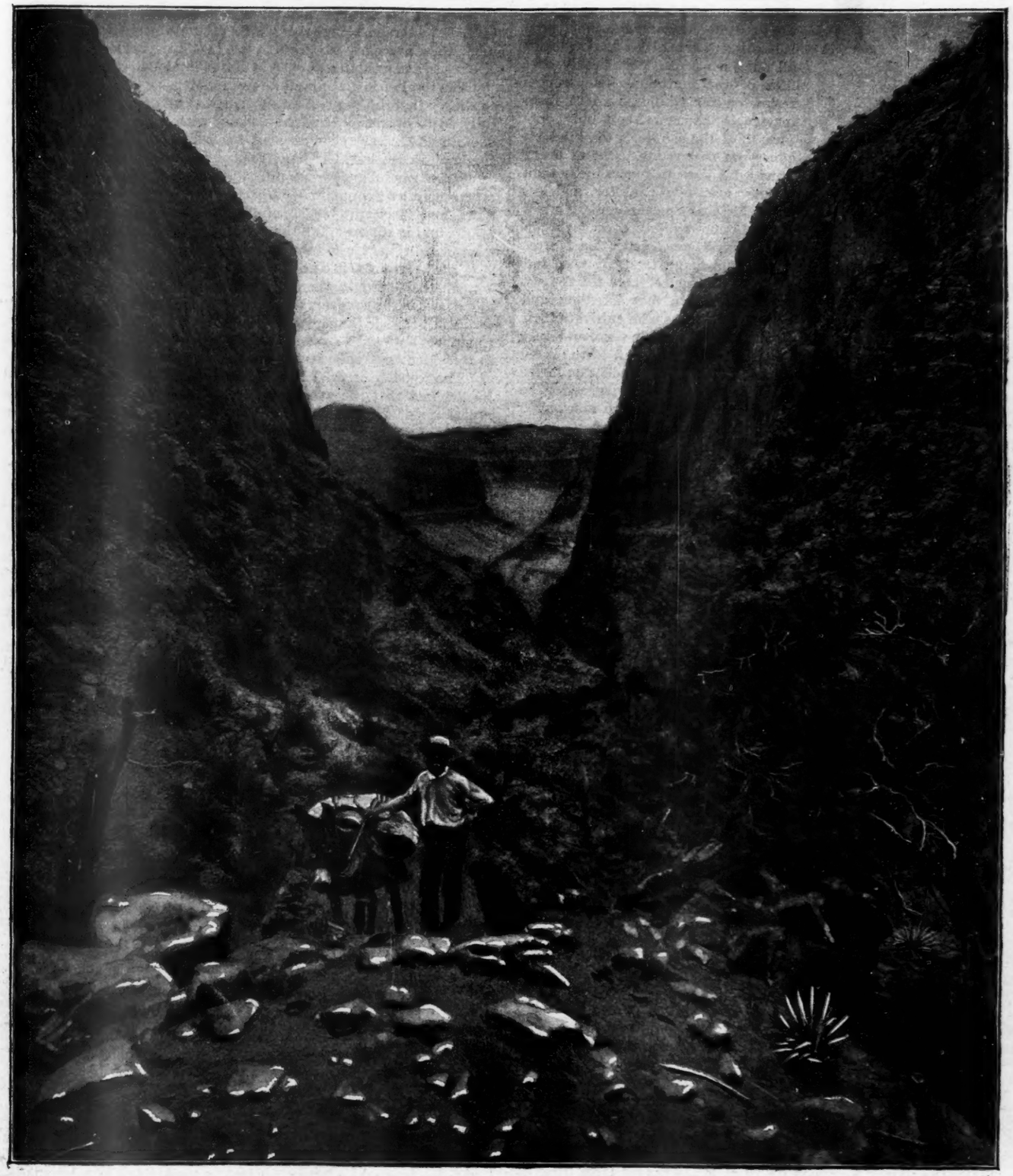

VISTA THROUGH A GRAND CANON GORGE OF THE COLORADO RIVER. (*See Page* 669.)

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FARM MORTGAGES IN THE UNITED STATES.

HERBERT MYRICK.

THE mortgaged farms constitute but one-fourth of the total number of farms in the United States, the other three-quarters being owned free of incumbrance. The average mortgage represents one-third the value of the farm upon which it is secured, but the total amount of farm mortgages is hardly one-tenth the total value of all our farms. In 1880, nearly one-fifth of the mortgage indebtedness rested on farms, but in 1890 farm mortgages represented only one-seventh of the country's total indebtedness on real estate. Out of every hundred American farms more than seventy are fully paid for, and less than thirty are mortgaged. Out of every hundred families on farms in 1890, forty-seven owned their farms free of mortgage, twenty owned but with incumbrance, and thirty-two hired the farms they lived on and worked. Of those who cultivate their own farms, seventy per cent. own without incumbrance, and only thirty per cent. have mortgages. Hardly ten per cent. of the hired farms are incumbered. Four-fifths of the *amount* of debt on farms and homes was incurred to buy and improve the property, and a like proportion of the *numbers* of farms and homes were mortgaged for the same purpose.

These are the results indicated by the census returns as far as made up — one inquiry complete for thirty-three, the other for twenty-two, out of our forty-nine States and Territories. Can any other nation in the world make so favorable an exhibit of its farmers' condition? It is the more remarkable here, because of the marvelous changes in American agriculture since the war, the vast area of new land that has been converted into farms, and the consequent downward tendency to values of farms and farm products.

Probably no other industry in America carries anything like so small a proportion of real estate indebtedness. In the farmers' case, the mortgage represents the bulk of his indebtedness, except in the South and those sections of the Western States in which a large personal indebtedness is borne in the shape of chattel mortgages. This form of debt is probably greatest in those Southern States where the obligation on real estate is least.

The most wonderful fact is that, taking these States noted in the table below to fairly represent the whole country, real estate mortgages amount to only fifteen per cent. of the estimated value of the lots and acres that pay taxes. The mortgages on acres are only fourteen per cent. of their value, ranging from seven in Arkansas to twenty-nine in Kansas. About one-third in number of the taxed acres are mortgaged, according to the average of fifteen States, Tennessee having mortgages on but little more than one-tenth of her assessed acres, while in Kansas the proportion is nearly twice as great.

Regarding only the mortgaged acres, their indebtedness averages forty-four per cent. of their estimated true value, being from thirty per cent. in Indiana to almost double that proportion in Missouri. Yet, though Missouri farms which are not paid for, bear a debt exceeding half their value, it should be observed that in this very State only about one-fourth of the taxed acres are mortgaged. This indicates that the breadth of Missouri farm land which is not paid for is comparatively small, but farms and village places of an acre or more in extent that are not paid for are mortgaged for more than half their value.

The indebtedness averages thirteen dollars per acre on mortgaged land, the true value of which is some thirty dollars. In Massachusetts, Rhode Island and Illinois, these figures are abnormally large, by reason of the considerable proportion of suburban mortgages on acres that are necessarily included. But in other States the money borrowed on rural lands ranges from three dollars per acre in Arkansas to four times as much in Vermont, while the value of Vermont's land is doubtless two or three times as much as is the case in Arkansas. The indebtedness on acres is only equal to three dollars for each acre that pays taxes, such land being worth on the average nineteen dollars. In no State (excluding Massachusetts and Illinois) does the money borrowed on acres exceed a mean of about four dollars per acre of the land that pays taxes, ranging mostly between two and three dollars per acre. The average value of this land is seven times as much as the debt on it, and even in Kansas the farm land on which taxes are paid is worth over three times the money that is borrowed on it.

The rate of interest is high compared to the security. It varies from 5½ to 9½ per cent., and on farms averages 7 per cent. At the smaller rate, the average mortgage on farms calls for an interest payment of $62 a year, while the higher rate calls for a payment of $107, the average being about $78. The *per capita* interest payment thus averages $6.50 per year, but goes as low as $1.28 in Arkansas, and as high as $14.69 in Kansas and $11.50 in Connecticut.

The total of loans on real estate and density of population vary so widely that the real estate mortgage debt *per capita* runs from thirteen to over two hundred dollars, with a mean of ninety-two dollars. There are good reasons for believing that mortgages in England, France and Germany vastly exceed the American average of ninety-two dollars *per capita*. Add to this the *per capita* amount represented by the public debts of the United States ($14.63), of the States and Territories ($3.56), and of the counties ($2.27), a total of $20.40, and it appears that the total public debt and all real estate mortgages in the United States amount to only $112 *per capita*.

In other words, in June, 1890, the sum of $112 from each man, woman and child in the United States would have paid all the mortgages in the country, and also all the National, State and county debts! In France the national debt alone exceeds $116 *per capita*, England's national debt is nearly $90 a head, while the public debts in the older Australian colonies are $300 for each inhabitant.

The security of the loans on many farms is further emphasized by the fact that the average value of the mortgaged acres in the States under review is $2,174, while the mean debt is $954—a balance of $1,220 above liabilities. The value of actual farms averages $3,190 for twenty-two States, and the mortgage $1,130.

The total real estate mortgage debt that existed in the United States in 1880 is estimated at two and one-half billions of dollars, equally divided between lots and acre tracts. In 1890, the total amount of such incumbrance had more than doubled, but only thirty-four per cent. of it was on acres and sixty-six per cent. on urban property. It is estimated, with approximate accuracy, that the existing debt on acres increased sixty-five per cent. from 1880 to 1890. Assuming that the debt on farms increased in the same proportion, and it is by no means certain that it increased as much, the farm debt of the nation in 1880 was 525 millions. It appears (see foot note) that in 1890 only about forty-three per cent. of the indebtedness on acre tracts rested on farms. The case may, therefore, be thus expressed:

In round millions of dollars,	1880.	1890.	Increase.
Mortgages on farms	525	877	352
Mortgages on other acre tracts	725	1,163	438
Total for acres	(1,250)	(2,040)	(790)
Mortgages on lots	1,250	3,960	2,710
Aggregate for the United States	2,500	6,000	3,500

Evidently the amount of farm mortgages proper in the United States increased about 350 million dollars during the ninth decade. In this period no less than 600,000 new farms were created, and if

NOTE.—The total number of farms in twenty-nine States—Alabama, Arizona, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Idaho, Illinois, Iowa, Maine, Massachusetts, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Utah, Vermont and Wisconsin—was 2,185,743 farms; number of mortgages on acres (not all on farms), 1,335,827; number of mortgages on lots, 1,746,507. Returns from twenty-two States show that twenty farms in every hundred are owned with incumbrance, and thirty-two are occupied by tenants. Hardly one-twentieth of the hired farms at the North are mortgaged, and in the South the proportion is not twice as large, so that it is well within the facts to allow that ten per cent. of the farms occupied by tenants are mortgaged, making a total of only twenty-three farms in every hundred in the whole country that are not fully paid for. Thus, out of these 2,185,743 farms, only twenty-three per cent., or 502,658 farms, are mortgaged. If there is but one mortgage to each incumbered farm, then of the 1,335,827 mortgages on acres in the States noted, only 502,658 are on farms, leaving 833,150 mortgages on acre tracts other than farms. This would indicate that only about thirty-eight per cent. of the number of mortgages on acres were liens on actual farms.

The official statistics for thirty-three States—including Arkansas, Indiana, Kansas and Tennessee, and the twenty-nine just named—show that thirty-four per cent. of the existing mortgage debt was on acre tracts. Thus the 1,335,827 mortgages on acres in the twenty-nine States represent 1,412 millions of dollars. We know that the average interest charge on mortgaged farms is $78, which would indicate that the average farm mortgage is under $1,200 (in twenty-two States farm mortgages average $1,130 each), or a total of $603,189,600 on the 502,658 mortgaged farms in these twenty-nine States. This sum is barely forty-three per cent. of the $1,412,000,000 indebtedness on acre tracts in these States. If this result for twenty-nine States applies to the whole country, then *only forty-three per cent.* of the indebtedness on acres rests on actual farms. In States with a large suburban population, the proportion is much less; Massachusetts has a debt of only $12,000,000 on owned farms, or but little more than one-fourth of the $42,000,000 of debts on mortgaged acre tracts including hired farms.

about one-half of them carried the average sized mortgage, this would readily account for the increase in the total debt on farms.

Only in the very newest regions does it appear that any considerable part of the mortgage was incurred for other purposes than the commendable one of buying and improving the place (see Table *A*). The number of families is practically one to a farm in most States, but for twenty-two States these farm families comprise only thirty-five per cent. of the total number of families. In this group of States only one-fourth of the farms were occupied by tenants in 1879, whereas now nearly one-third of the farm families are tenants—a gain in the wrong direction, but which cannot be intelligently discussed until fuller data are at hand. Certain it is that enough has been set forth herein—most of it for the first time,—to demonstrate that the facts about farm mortgages have been grossly distorted and exaggerated. The indications now are that the final figures will show that over two-thirds of our four and a half millions of farms are owned free of debt, and that all the mortgages on actual farms in the whole United States to-day do not exceed the value of one year's hay crop.

Table A—FARM HOMES AND THEIR PROPRIETORSHIP.

Twenty-two States.	*Farm families.*		*In every 100 such famil's farms are*			*Owned farms*			
	No.	*Per cent. of total.*	*Owned free by*	*Owned m't'gd.*	*Hired.*	*By per cent. of families.*	*Per cent. free.*	*Per cent. m'tg'd.*	*% of debt incurred to buy & imp.*
Arizona	2,2[illegible]	17	75	5	20	80	93	7	32
Connecticut	26,439	16	57	25	18	82	69	31	80
District of Columbia	387	1	60	3	37	63	96	4	100
Georgia	175,688	50	41	1	58	42	97	3	37
Idaho	7,997	44	74	15	11	89	84	16	51
Iowa	205,435	53	33	37	30	70	47	53	79
Maine	62,122	41	72	20	8	92	78	22	75
Maryland	41,372	20	44	19	37	63	70	30	80
Massachusetts	34,576	7	59	26	15	85	70	30	79
Minnesota	117,893	48	46	39	15	85	54	46	68
Montana	6,441	23	73	14	13	87	84	16	48
Nevada	1,514	15	70	14	16	84	83	17	52
New Hampshire	29,151	33	70	19	11	89	78	22	80
New Jersey	31,942	10	35	33	32	68	51	49	86
New Mexico	9,518	27	85	3	12	88	97	3	38
Rhode Island	5,500	7	61	14	25	75	81	19	80
South Carolina	117,405	53	35	3	62	39	92	8	32
Tennessee	183,726	55	56	2	42	58	97	3	71
Utah	11,884	31	86	5	9	91	94	6	56
Vermont	32,573	43	46	36	18	82	56	44	84
Wisconsin	148,349	44	50	37	13	87	57	43	80
Wyoming	3,534	29	69	10	21	79	87	13	32
Total 22 States	1,255,745	35	47	21	32	68	70	30	77

Only the very newest regions does it appear that any considerable part of the mortgage was incurred for other purposes than the commendable one of buying and improving the place (see

The whole truth will be known when the census is completed, but enough is now done to indicate that the final result will differ from the above conclusions in amount, rather than in proportion. A revulsion in public sentiment favorable to agriculture should follow a widespread discussion of these facts.

WINTER CARE OF HORSES.

Winter is a critical season for horses; and this is plainly evident from the fact that so many poor and ill-conditioned animals are then to be found. The causes are readily apparent. The autumn weather is very trying, very hot days are succeeded by damp, chilly nights; and often cold storms of wind and rain of longer or shorter duration prevail. Therefore, none but the most careful feeding and management will suffice to render the horse a delight to the eye during the winter. Farmers are especially prone to feed hay too freely to their horses. Hay, beyond a certain quantity, is a positive detriment. It unduly distends the bowels; and, from the small portion of nutriment it contains, the horse is obliged to consume inordinate quantities in order to support life. Two feeds of hay per day, of about ten pounds each, will supply sufficient bulky food. As regards grain, oats will form the main dependence, as they agree with the horse better than any other cereal. Horses used for rapid work may have a mixture of three parts oats to one of bran; hard-worked farm horses, equal parts oats, bran, and cracked corn. Six to twelve quarts of grain per day, according to the work performed, is a sufficient quantity for the horse. Roots are excellent for improving the appetite. Bran mashes of four parts

OFFICIAL STATISTICS OF THE FARM MORTGAGES IN THE UNITED STATES, ACCORDING TO THE CENSUS OF 1890.

Prepared for the American Agriculturist by GEORGE K. HOLMES, Special Agent in Charge of the Division of Farms, Homes and Mortgages of the Eleventh Census, with Additions and Comment by the Author.

AUTHOR'S NOTE: Inquiry into existing mortgage indebtedness was a new feature of the census of 1890. It was an undertaking of enormous proportions, and evidently has been carried out with the utmost care and fidelity. It was found impossible to strictly separate mortgages on farms from those on city property, but the acre was adopted as the unit. Much village and suburban indebtedness is on tracts of one acre or more, and thus is included with farm mortgages proper, but the unit of lots (less than an acre) gives an accurate idea of the burden borne by town and city real estate. The fact that the average number of acres to each mortgage is 112, varying in most of the States between sixty and two hundred acres, would seem to indicate that the data as to acres should apply to farms. But it is shown in the Note that probably 38 per cent. only of the number of mortgages on acres are liens on farms, and that such farms carry only forty-three per cent. of the amount on acres. The values employed are the "estimated true value," adopting averages for all assessed acres, the manner of arriving at which is described in Census Bulletins.

The following table was prepared by Mr. Holmes from the official data, with three exceptions: First—Single figures, columns or lines marked by an asterisk (*) indicate our own calculations. Second—The column of averages was also compiled by the writer from the data for the number of States reported, except that data from twelve other States are included as explained in foot notes *A* and *C*. Third—The last eight lines were rearranged from Mr. Holmes' official data for thirty-three States, the totals and averages in these lines being for all these States, as explained in foot notes *A* and *C*.

	Ark.	*Ala.*	*Ct.*	*Ill.*	*Ind.*	*Iowa*	*Kan.*	*Me.*	*Mass*	*Minn*	*Mo.*	*Neb.*	*N.H.*	*Ore.*	*Pa.*	*R. I.*	*Tenn*	*Vt.*	*Wis.*	**Av.*	*Colo.*
Percentage of value of all taxed real estate represented by the debt in force	7.34	10.96	20.14	14.06	9.79	17.61	28.13	13.28	19.42	18.83	16.15	24.58	11.68	8.11	18.91	12.13	8.67	19.21	12.46	15.11	14.75
Percentage of value of all taxed acres represented by the debt in force against acres	6.89	11.58	.....	13 27	9.29	17.96	29.27	.....	.....	15.62	14.82	25.85	.....	10.33	.....	.....	5.83	.....	13.05	14.20	10.92
Percentage of value of all taxed lots represented by the debt in force against lots	8.27	9.54	.....	14.72	10.99	16.66	25.60	.....	.....	21.55	17.57	22.24	.....	5.42	.....	.....	13.01	.....	11.42	15.02	18.29
Per cent. of number of taxed acres mortgaged	12.12	21.63	17.70	30.78	30.38	46.95	61.56	.....	20.49	35.73	25.41	58.13	.....	31.69	.....	.....	11.65	31.86	32.56	32.12	30.90
Per cent. of value of mortgaged acres represented by the debt on acres	56.81	53.52	.....	43.13	30.58	38.25	47.53	.....	.....	43.73	58.31	44.47	.....	32.58	.....	.....	50.02	.....	40.07	44.18	35.34
Average amount of debt in force per assessed acre	$0.37	$1.04	$5.30	$4.77	$3.32	$4.30	$4.05	.....	$9.45	$2.64	$2.54	$3.74	.....	$2.00	.....	.....	$0.63	$3.71	$2.60	$3.19	$2.59
Average amount of debt in force per mortgaged acre	$3.07	$4.80	$29.92	$15.50	$10.93	$9.17	*$6.57	3.46	$46.12	$7.38	$10.01	$6.43	$8.19	$6.32	.....	$54.51	$5.44	$11.66	$7.98	$13.08	$8.39
Av. value of each assessed acre	$5.41	$8.96	.....	$35.95	$35.73	$23.96	$13.83	.....	.....	16.88	17.17	14.45	.....	19.40	.....	.....	10.88	.....	19.92	18.94	23.74
Av. rate interest on existing debt	9.08	8.06	*5.64	6.69	6.84	7.61	8.64	6.15	5.41	7.66	7.68	8.24	5.98	9.46	5.61	5.72	6.00	5.98	6.84	7.09	.....
Average rate of interest on existing debt on acres	9.12	8.13	5.70	6.92	6.90	7.53	8.56	6.22	5.64	7.95	8.15	8.37	5.98	9.39	.....	5.77	6.00	5.97	6.86	7.26	.....
Ditto on lots	9.01	7.86	5.63	6.52	6.71	7.84	8.86	6.09	5.38	7.48	7.25	7.96	5.98	9.59	.....	5.71	6.00	5.98	6.79	7.12	.....
Average number of acres covered by each mortgage	143	222	36	83	64	95	131	132	28	105	98	131	79	156	.....	37	176	75	91	112	171
Av. amount of each mortgage	$484	$1,105	$1,3[illegible]8	$1,293	$646	$791	$814	$554	$1,814	$1,011	$1,118	$855	$753	$1,017	$1,194	$1,719	$1,024	$812	$739	$1,015	$1,542
Average amount of each mortgage on acres	$439	$1,064	$1,070	$1,281	$702	$872	$859	$457	$1,271	$776	$986	$844	$648	$984	.....	$1,993	$955	$872	$730	$954	$1,435
Average amount on lots	$587	$1,238	$1,461	$1,302	$554	$620	$716	$663	$1,939	$1,243	$1,270	$880	$897	$1,102	.....	$1,680	$1,077	$700	$759	$1,052	$1,608
Average value of acre real estate covered by mortgage	$774	$1,987	.....	$2,971	$2,287	$2,279	$1,808	.....	.....	$1,772	$1,683	$1,899	.....	$3,026	.....	.....	$1,910	.....	$1,813	$2,174	$4,060
Total mortgage debt *per capita*	$13	$26	$107	$100	$51	$104	$170	$49	$144	$152	$80	$126	$50	$73	$117	$106	$23	$84	$72	$92	$206
Annual interest *per capita**	$1.18	$2.10	$11.14	$6.69	$3.49	$7.91	$14.69	$3.01	$7.79	$1,164	$6.14	$10.38	$2.99	$6.91	$6.55	$6.06	$1.38	$5.02	$4.92	$6.52	.....
Annual interest per mtd. farm	.....	.....	$70	.....	.....	$97	.....	$33	$74	$67	.....	.....	$44	.....	.....	$89	$41	$59	$66	*a* $78	.....
Av. value of mortgaged farms	.....	.....	$3,115	.....	.....	$3,964	.....	$1,449	$3,158	$2,574	.....	.....	$1,940	.....	.....	$3,581	$1,663	$2,405	$3,005	*a*3,190	.....
b Total mortgage debt	$14	$39	$80	$384	$111	$200	$243	$33	$323	$198	$215	$133	$19	$23	$613	$37	$40	$28	$122	*c*4,935	$85
Per cent. of this total on acres	63	74	16	43	67	75	72	43	13	38	47	68	50	70	28	14	41	70	67	*a* 34	35
Av. life mortgage on acres, years	2.7	3.0	5.4	5.1	5.0	5.1	3.7	6.5	6.9	4.3	3.7	3.8	6.0	3.3	5.3	5.6	2.9	5.4	5.7	*a* 4.6	2.5
d No. of mortgages on lots	9	8	46	168	65	81	96	28	145	99	89	48	11	6	347	19	22	12	53	*c*1,938	34
d No. of mortgages on acres	21	27	12	129	106	171	203	31	33	97	103	107	15	16	171	2.6	17	22	112	*c*1,683	21
d No. of farms	.....	158	26	241	.....	202	.....	62	34	117	238	114	29	26	212	5.5	.....	33	146	*c*2,186	16

a Includes official average for the States named and also for Ariz., D. C., Ga., Ida., Md., Mont., Nev., N. J., N. M., S. C., U., Wyo.
b The total mortgage indebtedness is expressed in round millions of dollars, and covers the liens in 1890 on both lots and acres.
c This is the *total* (not average), for the States in table and also for those mentioned in foot note *a*, expressed in round millions of dollars.
d These lines are in round thousands, the last three figures (hundreds, tens and units) being omitted.

bran, two parts corn meal and one part linseed meal, seasoned with a tablespoonful of salt, are of great value to the horse. Grooming is very essential, and should be performed daily and thoroughly.

AMERICAN STANDARD RATIONS FOR MILCH COWS.

The question of the most economical feeding of dairy cows is one that has always perplexed the progressive dairyman, and it is not yet settled. These things, however, are pretty well agreed upon: First, that it takes about nine pounds of digestible matter per day to sustain a steer or a dry cow of 1,000 pounds live weight, without losing or gaining anything; second, that the amount of feed above a maintenance ration given a dairy cow will be returned in milk or laid on in flesh; third, that a narrow or nitrogenous ration, that is one rich in digestible protein, will give a larger flow of milk than a wider ration, or one containing more sugar and starch, although the cost of the former ration is more.

German investigators have done a great deal to establish a standard ration, and Wolff has set up a standard that has been much followed. Kuehn recognizes individuality in cows, and thinks that the ration may profitably vary, according to the stage of lactation, yield and power of production of each cow, within the range set forth in the table below. The Wisconsin experiment station has made a careful study of twenty-one complete rations used by sixteen of the best dairymen in that State, whose cows averaged 5,806 pounds of milk and 291 pounds of butter per year, and from these data worked out the average composition of the rations employed, which is given under "Wis." Combining with this the results obtained at the Connecticut and New York (Geneva) experiment stations, the average rations employed in twenty-eight American herds were ascertained, and are given in the last column of the following table, compared with the average ration employed by the Wisconsin dairymen, by Kuehn and by Wolff:

GERMAN STANDARDS COMPARED WITH AMERICAN RATIONS.

Pounds of each substance required per 1,000 pounds live weight.	*German Stand'rds*		*American Stand's.*	
	Wolff.	*Kuehn.*	*Wis.*	*Americ'n*
Dry matter	24.0	20 to 33.5	26.1	25.1
Containing of digestible protein	2.5	1.5 to 2.4	2.2	2.2
Sugar, starch, etc.	12.5	12 to 14	13.6	13.1
Fat	0.4	0.4 to 0.7	0.7	0.7
Total digestible	15.4	14 to 17	16.5	16.0
Nutritive ratio	1:5.4	1:6 to 1:8	1:7	1:6.8

The last column may be considered, therefore, as an approximate feeding standard for American dairymen. While not as accurately obtained as the German standards, it will serve a much better purpose for our conditions, as it sums up the experience of our most successful dairymen, who take into consideration local conditions and variations of individual cows or herds. The cost of the Wisconsin rations average fifteen and one-third cents per day for each cow at the current market values for grains and fodders. Some rations, which approximate to the American standard, and which may be relied upon as giving good results, are as follows:

Ration I—Corn silage, 40 lbs.; clover hay, 8 lbs.; wheat bran, 6 lbs.; corn meal, 3 lbs.

Ration II—Fodder corn, 20 lbs.; hay, 6 lbs.; oats, 4 lbs.; shorts, 4 lbs.; oil meal (O. P.), 2 lbs.

Ration III—Corn silage, 50 lbs.; stover (cornstalks), 5 lbs.; oats, 6 lbs.; malt sprouts, 4 lbs.; corn meal, 2 lbs.

Ration IV—Clover silage, 30 lbs.; hay, 15 lbs.; wheat bran, 3 lbs.; corn meal, 3 lbs.; cotton seed meal, 2 lbs.

Ration V—Timothy hay, 10 lbs.; clover hay, 10 lbs.; wheat bran, 6 lbs.; oats, 6 lbs.

Ration VI—Fodder corn, 20 lbs.; clover hay, 8 lbs.; oats, 6 lbs.; oil meal (O. P.), 3 lbs.

Ration VII—Corn silage, 50 lbs.; hay, 10 lbs; wheat bran, 4 lbs.; oats, 6 lbs.; oil meal (O. P.), 2 lbs.

Ration VIII—Corn silage, 45 lbs.; clover hay, 5 lbs.; wheat bran, 8 lbs.; oil meal, 2 lbs.

Ration IX—Corn silage, 32 lbs.; clover silage, 22 lbs.; clover and timothy hay mixed, 5 lbs.; wheat bran, 6 lbs.; oats, 4 lbs.; cotton seed meal, 3 lbs.

THE CHEMICAL COMPOSITION OF THE ABOVE RATIONS: In each hundred weight of the above rations, the number of pounds of the various ingredients are as stated in the following table:

No. of ration.	*Dry Matter.*	DIGESTIBLE.				*Nutritive ratio 1 to **
		Protein.	*Carbohydrates.*	*Fat.*	*Total.*	
I	24.44	2.01	13.23	.75	15.99	7.4
II	25.60	2.10	14.49	.75	17.34	7.7
III	25.25	2.13	13.69	.78	16.60	7.2
IV	26.32	2.53	12.97	.77	16.27	5.8
V	26.19	2.26	13.21	.70	16.17	6.5
VI	27.35	2.40	14.12	.85	17.37	7.0
VII	25.18	2.11	13.58	.79	16.48	7.3
VIII	29.00	2.97	14.83	.96	18.76	5.7
IX	24.50	2.87	11.56	.96	15.39	4.8

*This means in case of No. 1 for instance, that this ration contains one pound of digestible protein to every 7.4 pounds of the other ingredients.

It will be noticed that although rations IV, VIII and IX are narrow rations, they are made so by the use of feeds which are not so expensive as others, and many of which can be raised on the farm. While it is true that a narrow ration will produce a larger flow of milk than a wider one, yet the narrow ration usually costs so much more, that it may be advisable to sacrifice a small yield to cost. The narrow ration can be greatly cheapened by raising and feeding peas, oats and clover, and all farmers should aim to have a good proportion of these foods. The exact cost of each of the rations can be figured by knowing the market value of each food mentioned.

Considering the question of feeding from a financial standpoint, the feeder is at once struck with the fact that all of these are heavy rations, especially ration IX, yet this ration fed to a herd of thirty Guernsey cows, averaging 1,150 pounds of live weight, produced 7,000 pounds of milk and 400 pounds of butter per cow per year for the whole herd, and the milk averaged 5.11 per cent. of butter fat. Figure on the profit of this, ye light feeding and thin milk dairymen!

A comparison of the rations which these Wisconsin dairymen fed and the product given shows that the heaviest feeding gave the largest return in milk and butter, and also that the rations containing the largest per cent. of digestible protein seem most effective, other things being equal. It takes a certain amount of food to keep up the nutrition of the system; feed a cow more than this and she gives the extra amount back in milk or flesh; increase the amount up to her capacity of digestion and assimilation, and you get the maximum return in her product, and, as a rule, the maximum return, or near it, is the most profitable. Farmers should, therefore, consider not only the question of heavy feeding, but feeding properly proportioned and balanced rations.

COLD STORAGE FOR APPLES.

E. G. OSMAN, ILLINOIS.

One important point has been settled by the experience of exhibitors of apples at the Columbian exposition, that deserves attention. Cold storage has been a success in the preservation of apples in prime condition from picking season until July. All of the apples were held in cold storage. The method of packing adopted by substantially all the exhibitors was the same. When the fruit was picked from the trees in the fall each was immediately wrapped in a piece of thin paper, and then packed in tight barrels with loose cooperage, such as flour barrels, and thus shipped by rail to Chicago, where they were stored in cold rooms, and held until their removal in May and June, at a temperature of 33° F. They would, no doubt, have withstood 32° without freezing; but 33° has been found satisfactory in every way. There was no attempt to ventilate the fruit. All the apples so picked and stored, whether they came from New York, Illinois, Minnesota, Michigan, or Wisconsin, came out in prime condition, bright in color, sound, and fully as rich in flavor as they were in the fall. This was conspicuously true of Pound Sweets, Fall Pippins, and other varieties of fall apples which are classed as poor keepers, and are usually gone before Christmas. In a few instances the skin showed, in May and June, a slight scald, but the pulp below was perfectly sound under the scald, and when the breaking down came, two to three, and even four weeks later, the signs of rotting were as likely to appear under the bright skin as under the scald.

In the New York exhibit of apples were one lot of Nellis, and one of Fall Pippins, which were treated, in picking and packing, the same as the other fruit, but were, by accident or carelessness, frozen solid in a cold storage house at Rochester, where they were temporarily stored. Yet when these were carefully thawed out, by a slow elevation of the temperature, to above freezing, they were then shipped to Chicago and held, like the rest, at 33° until April or May, when they were put on the exhibition plates. When I saw this fruit, May 24th, it was perfectly sound and good, though an expert could detect a slight depreciation in the richness of flavor, due, no doubt, to the freezing. All of this fruit shown by the States named kept in good condition from two to three, and some even four weeks, on the exhibition plates before it began to break down, showing conclusively that the system of cold storage is amply able to carry over apples from one season to the opening of the next, and turn out the fruit in condition to market safely in warm weather of the early summer.

Canadian apples, similarly picked and packed, were consigned to a different cold storage, their wrappers removed, and holes cut in the barrels for ventilation; temperature fluctuated from thirty-three to forty-three degrees. Most of the lot was ruined, and but few of the balance would stand up on exhibition more than a week or ten days. The lesson of this experience is obvious.

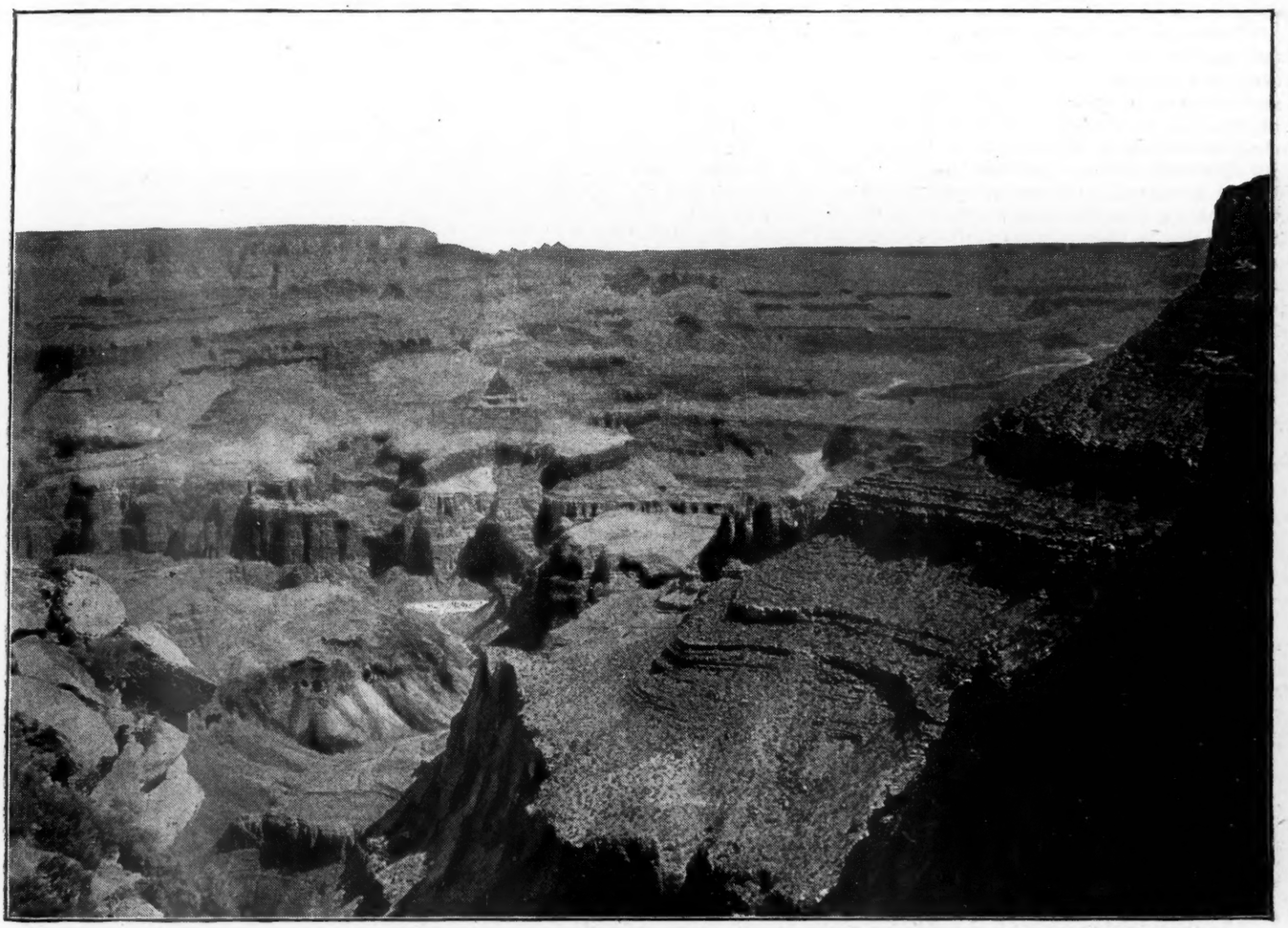
THE GRAND CANON OF THE COLORADO.

JAMES K. REEVE.

The greatest natural wonder in all the world is the vast chasm that forms a portion of the bed of the Colorado river in Utah and Arizona. I have never found any traveler of sufficient temerity to name any other work of man or of nature as being worthy of comparison with it. Being familiar with the descriptions which other travelers had given of it, I was prepared to behold a great wonder. But the imagination of a man is not equal to the task of picturing the cañon until he has actually beheld it. Mere figures are of little consequence in such matters, but it may help one's conception of it somewhat to know that this rift in the earth's surface is at one point a mile deep and twelve miles wide. I was told by one of my guides that the first question asked by most visitors to the cañon is, "How came it here? What caused it?" Their impression seems to be that it is a great rent made at some instant of time, by some sudden and all-mighty force. But I am glad to know that scientific men have been able to give us a natural explanation of this wonder of the world.

Lying principally in Northwestern Arizona, but having its beginning in the high plateaus of Southern Utah, is what is known as the "Grand Cañon District." This has a total length from northeast to southwest of about one hundred and eighty miles; while its width is one hundred and twenty-five miles, and its total area nearly fifteen thousand square miles. Its upper limit is a series of terraces, miles broad, dropping step by step. These steps mark successively lower geological formations until in Arizona the formation is reached which constitutes the platform that borders the chasm. By the slow erosion which has been going on for ages, ten thousand feet of strata have been swept away from the upper surface of this entire platform. The present upper formation is the Carboniferous; in order to correspond with the terraces above, there should be upon this the Permian, Mesozoic and Tertiary formations, which are missing. Thus the wonder is not that the gorge is six thousand feet deep, but that it is not sixteen thousand, as it would be were these formations in place. The plateau as it exists has risen before the pressure of the internal forces, and the river, which had to have an outlet, as it was the drainage system for a vast district, simply kept its bed worn down to the level of erosion. The pressure of the water but sawed the channel free.

That one is able to understand the process by which nature has worked does not lessen the effect of this masterpiece. What this effect is I have not yet found words to accurately describe. It seems to me that the chief impression is that of the complete insignificance of man, in the presence of nature in her loftier aspects. As one descends into the cañon this feeling deepens. The trail is long and rough, nearly four miles to compass the one of sheer descent, but every step is marked by a new wonder. Huge cliffs and towers start out from what in the distance had seemed a perpendicular wall. The rock shows a medley of color that no painter's canvas can rival. There are gigantic niches in the face of the wall—caverns that doubtless were the dwelling places of wild men ages ago. In places ropes must be used as there are sheer drops of forty feet, and it requires faith both in your rope and your guide.



A GLIMPSE OF THE GRAND CANON DISTRICT.

What one finds at the bottom of the Colorado cañon is worth the toil needed to reach it. Here is the heart of the river in its bed of beds. From the top of the gorge we had seen a little silvery stream; it is difficult now to believe that this is the same. Not more than three hundred feet wide, but with a velocity of fifteen miles an hour, it shoots forward with a violence and turmoil that rivals the Whirlpool Rapids of Niagara. There is another value to what one sees here that I appreciate, although some might not. It lies in the fact that this has been seen by so few. There is a certain satisfaction in being ahead of the rest of the world in doing and seeing things, and it may seem strange but it is true that this cañon, lying so close to a main route of our overland travel, has been visited by fewer people than have penetrated into the wilds of

Africa. Until within the last twenty-five years it is probable that not more than a dozen white men had ever seen it, and even the stories that the Indians told of its existence were regarded as apochryphal. It is now easily reached, being but a day's stage journey from three different points on the Atlantic and Pacific railroad. Flagstaff is the best point of departure, as there is a regular line of stages from there to the most imposing part of the cañon. Travelers who visit the Pacific coast and who desire to see that which is best worth seeing on the way, cannot do better than to break the journey at Flagstaff and spend from three days to a week at the cañon. [Our frontispiece and the illustration on the preceding page, both of which were engraved from photographs, present some picturesque scenes in the wonderful Grand Cañon of the Colorado.]

CULTURE OF THE POTATO.

J. J. WILLIS, SUPERINTENDENT OF LAWES AND GILBERT'S EXPERIMENT STATION, ROTHAMSTED ENGLAND.

Taking thirteen countries where the potato is largely grown, their aggregate area under the crop being about twenty-one million acres, and their aggregate produce about sixty-one million tons, there is not one that reaches the average produce per acre of Great Britain. Norway, Belgium and Holland the most nearly approach the yield of Great Britain, and it is of interest to observe that these and Denmark, are the countries that most nearly approach the United Kingdom in yield per acre of wheat and barley also. It is then, only the countries of small total area, and of small area under the crop, that at all nearly equal Great Britain in yield per acre of potatoes; and among them Belgium and Holland more nearly approach the United Kingdom in density of population, and in the quantity of live stock kept per acre, and consequently in the supply of animal manure. The aggregate area under potatoes in the United Kingdom is rather over one and one-third million acres, and the aggregate produce is rather more than six and one-half million tons of tubers. Against this, we find that the United States of America has an aggregate area under the potato crop of nearly two and one-fourth million acres, giving an aggregate produce of about four and one-fourth million tons of tubers, equal to an average yield per acre of 1.87 tons only, being the lowest average quantity per acre obtained in either of the thirteen countries where potatoes are extensively grown.

The following table shows us the chemical composition of potato tubers and of potato vines, also the quantities of the various constituents abstracted from the soil by the growth of one thousand pounds of tubers and of one thousand pounds potato-vine, both in the green and in the ripe condition.

	In 1,000 pounds of		
	Tubers.	*Vines, green.*	*Vines, ripe.*
	Lbs.	*Lbs.*	*Lbs.*
Water	750.0	825.0	770.0
Organic matter	241.0	159.4	218.2
Ash	9.0	15.6	11.8
The Ash consists of—Potash	5.2	2.3	0.9
Soda	0.1	0.4	0.1
Magnesia	0.4	2.6	2.7
Lime	0.2	5.9	5.5
Phosphoric acid	1.8	1.0	0.6
Sulphuric acid	0.6	0.9	0.6
Silica	0.2	1.2	0.5
Chlorine	0.3	0.7	0.4
Sulphur	0.2	0.6	0.5

The data thus given show us in a conspicuous manner that in the culture of the potato special study should be devoted to the needs of the tubers, as distinguished from the requirements of the vines. It is a common experience that while a full crop of potato tubers cannot be secured without luxurious growth of vine, yet there is often luxuriance of vine with a poor yield of tubers. This happens when the fertilizer used or the soil itself contains an excess of lime, as when superphosphate or gypsum has been applied without other ingredients; and the contrary is found to be the case where potash fertilizer or wood ashes have been used. In the culture of this crop experience shows that a liberal use of the complete artificial manures which contain all the constituents of the plant, including vines and tubers, answers best. That is to say, although the crop requires a full available supply of potash, magnesia, lime and phosphoric acid within the soil, yet that these constituents being provided the amount of produce is largely dependent on the available supply of nitrogen at the command of the plant. In practice, barnyard manure, or seaweed, where it can be obtained, is mainly relied upon. These are used in very large quantities per acre, and are sometimes supplemented by liberal dressing of artificial manures, both mineral and nitrogenous. It is probable that, independently of the liberal supply in barnyard manure of all necessary constituents of the potato crop, its beneficial effects are in a considerable degree due to its influence on the mechanical condition of the soil, rendering it more porous and easily permeable to the surface roots, upon the development of which the success of the crop so much depends.

Then again something may be due to an increased temperature of the surface soil engendered by the decomposition of so large an amount of organic matter within it, while the carbonic acid evolved in the decomposition will, with the aid of moisture, serve to render the mineral resources of the soil more soluble. The potato is, indeed, largely a kitchen and market garden crop, as well as a farm crop; and for the production of garden vegetables generally very large quantities of barnyard or stable manure are applied, beyond what is required as a mere supply of constituents to the crops—the process being to a great extent one of forcing; and a necessary result is a great accumulation of unexhausted manurial residue within the soil. In fact, the potato crop removes a less proportion of the nitrogen of barnyard manure than any other farm crop. It has also been found that the most characteristic result of the increased growth of potatoes under the influence of nitrogenous manures is an increased production of starch, which means flouriness, mealiness, or a superior quality of tubers. Poor and inferior soil cannot yield first-class potatoes, they must of necessity be of a waxy nature after cooking, because they lack the constituents necessary for the formation of starch.

It has been found in the Rothamsted potato experiments that potato disease, though largely dependent on season, developed much more in tubers grown by highly nitrogenous manures, and containing a juice rich in nitrogen, than under contrary conditions. Finally, it has been shown that a result of the disease is a destruction of starch, the formation of sugar, the loss of organic substance, and the growth of the fungus at the expense of the tuber.

THE LESSON OF A CYCLONE.

G. A. WOOLSON, VERMONT.

All true lovers of nature appreciate a fine tree; particularly if grown on one's own lawn we feel its personality, and are more keenly alive to threatening dangers. New England is not conservative in climatic matters. Last May a "spry wind," such as we associate with the "wild West," not only removed the roof from my neighbor's barn, but made sad havoc among shade and fruit trees. Fifteen trees went down before our eyes, and it is of a tree saved by the appearance of the providential man with chain and ladder before the wind was at its height, that I wish to write. This maple stands about twelve feet from my house, and is five and a half feet in circumference.

Sixteen years ago signs of splitting were observed, and a bolt was put through the tree; just where it was inserted has long been a matter of guess work, but wherever it was, it must have rusted off, for in this particular gale the tree was observed to be bending down to the ground and in imminent danger of crashing into a gable window, which catastrophe was averted by the aforesaid man and chain. This tree was trimmed high in its youth, and has, in consequence, a full, round top, which must, in the future, be supported to save further strain on the damaged trunk. Just the best way of doing this was an open question. It was not deemed advisable to leave the chain, for girdling attends both chains and bands. Bolts are of use when the tops are light and tapering, but to be of service when they are full and heavy would require bolts of a size injurious and difficult to insert through any two branches, as Nature rarely grows such exactly on a line. The simple device adopted might well be used on many valued trees to prevent like disasters. Two pieces of half-inch tire, fourteen inches long, slightly curved to fit the outside of the two main branches, were joined with three-quarter inch bolts, three and a half feet long; a four-inch thread on the end of each bolt leaves space to loosen the nut each year as the tree expands. This structure was placed some eight or ten feet above the crotch of the tree.

It is unobjectionable in point of looks, and is strong. To prevent possible girdling of the bark by the heavy tire, the soles of a pair of old rubbers were nailed to the tree inside the iron. Furthermore, to prolong its life it was advisable to stop the water from trickling into the heart of the tree, which was done by stuffing the crack with paint skins, a liberal collection being taken for the purpose, and reduced to a neutral tint—as near the color of the bark as possible. Isolated maples, whose roots have had ample room to spread, rarely uproot; therefore, if this carefully ironed and artistically filled tree is not on duty for a score of years to come, vegetable depravity alone will be responsible for the failure.

FREESIAS FOR WINTER FLOWERS.

C. L. ALLEN.

These bulbs are conspicuous among the many that have been introduced from the Cape of Good Hope, not only for their graceful forms and pleasant fragrance, but for their uses in the window garden, and for florists' use as cut flowers. The species were occasionally found in botanical and private collections as early as 1815, but they did not become of general use until within the last ten years. Whether there is more than one species is a question in dispute; that there are distinct varieties, no one that has watched their growth will deny, and that there is a sad mixture or running together of these is plainly apparent. *Freesia refracta alba* is the type, or variety, in demand by the florist. Its flowers are pure white, slightly relieved by a tint of yellow and delicate streaks of lilac in the lower part of the tube. There have been sent out two varieties of this, the one being *F. refracta*, which has delicate yellow flowers; the two being considered the same species. *F. Leichtlinii* is of a cream yellow, with an open brown throat, and a less delicate perfume. The freesia bulb is very easily managed, but it admits of but one condition of growth. That is in a cool greenhouse, and without any attempt at forcing. The bulbs may be planted at any time from August to October; after that they begin to dry up and lose their vitality. They can be grown in boxes or pots; if in boxes they should not be less than four inches deep, five would be better, as they root and form new bulbs deeply. Although the bulbs are small, they succeed best when allowed considerable room. The first size should be placed two inches apart each way, and covered with one inch of soil. If in pots, put from five to seven bulbs in a six-inch pot. Press the soil firmly over them, and put the pots, or boxes, under the bench, giving them only sufficient water to keep the soil moist, but not wet. Let them remain until the tops appear above the surface, then remove to the bench where they are to grow. It is best to grow in pots, because, in case of vigorous growth, the pots can be placed so as to give the plants the required room. The temperature of the house should not, at any time, rise above 70° F., and good ventilation should be secured. Never allow the soil to become dry. After flowering they should be given more heat, to ripen the bulbs. The too common practice of putting the plants under the bench to ripen off is not a good one, as the bulbs produced will be small and weak. In common with all other bulbs, the preparation for the next year's flowers are completed the previous season; it is, therefore, important to give the bulbs every possible help, not only to develop size, but blooming qualities.

FREESIA REFRACTA ALBA.

WATERING HOUSE PLANTS.

Plants may be injured by too frequently watering the surface of the soil. To water thoroughly, when the plants require it, is essential, and this is the proper method. Many plants, when a solid ball of roots is formed, do not get water enough when it is applied in the ordinary way, as it runs off the surface or down through the pots, next the outside, without wetting the roots at all. It is a good plan, and a saving of time, once a week, to place the pots in a deep vessel so that the water will come over the tops of the pot, and leave them for an hour or two, or until the air bubbles cease. Syringing over and under the surface of the leaves will not only keep them clean and free from insects, but will afford much of the moisture required. It is better not to water some plants until they indicate the need by the drooping leaves, then water thoroughly.

THE WINDOW-GARDEN IN EARLY WINTER.

EBEN E. REXFORD, WISCONSIN.

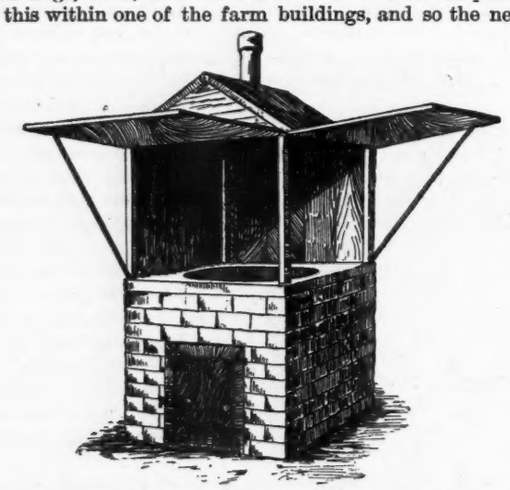
Early winter is a critical time in the life of plants in the sitting-room windows. They have not, as a general thing, recovered fully from the effects of repotting or removal to the house from the garden, or wherever they were kept during the summer, where they had all the fresh air they could make use of. In the house, there will be lack of good air, and the temperature of most rooms will be unhealthily warm, because the human occupants feel keenly the chill of coming winter after the languid warmth of fall, and keep hot fires going, to burn a great share of vitality out of the air. The plants may be forced to make considerable growth, but it will be a weak one. Another drawback is the lack of sunshine that characterizes this season of the year. Plants that are growing must have sunshine in order to make their growth healthy. In order to do the best for our plants, with an eye to their future, we must treat them in such a manner, at this time, as to keep them as dormant as possible. Let them be getting ready for future work, under more favorable conditions; give but little water,—just enough to keep them from wilting. A liberal supply of water, combined with the effects of warm rooms and impure air, encourages that rapid but unsubstantial growth which is weakening to the plant. On no account give manure. Some persons seem to think the application of a fertilizer is all that is necessary to remedy all the evils plants are heir to. Such is not the case. No plant, not in a healthy condition and making active growth, should be given fertilizers, as it is not in a condition to properly assimilate and make use of strong food. When it begins to show, by vigorous, healthy growth, that it is a condition to dispose of stronger food, give it, but not till then. Too rich a soil only aggravates the trouble under which most plants labor, at this season. Make it a point to give your plants as much fresh, pure air as possible. Do not open the window at which they stand, so that the cold, sharp air from out of doors will strike directly on them, for this may injure them almost as much as a frost, in their weak and enervated condition. Rather open another window, at some distance, or a door, and let the room fill with fresh air which will mix with the warm air of the room before it reaches the plants. Make it a rule to do this at least once a day in favorable weather. Twice a day would be better. It is impossible to give plants or people too much pure air. Provide the room in which your plants are kept with a thermometer, and see that the temperature does not rise above seventy-two degrees. Seventy would be better, and perhaps sixty-five would be better still. Most persons, however, seem to feel the need of more warmth than is obtained by sixty-five degrees of heat. It would undoubtedly be better for them, as experience proves it to be for plants, if our rooms could be kept cooler than they are. But if fresh air is admitted freely, the bad effect of a high temperature is to some extent counteracted.

Give all the sunshine possible. Never allow the shades to be drawn down by day, and dispense with curtains. Let your plants beautify their window, and put your pretty curtains in some room where there are no plants to use the light. Shift the plants

about in order to give all of them a chance of getting some benefit from what little sunshine there is. Put the taller and larger ones back of the small ones, and farthest from the window. With the low-growing kinds near the glass, the large ones will get a fair amount of sunshine without robbing the others, or by being robbed by them. Stir the soil frequently, and be sure to not give more water until the surface of the soil seems really dry. This is, perhaps, the most important thing to bear in mind at this season.

LOCATING A FARM KETTLE.

One of the necessities upon a farm is a set kettle for boiling food for hogs, hens, and other stock. It is often impossible to locate this within one of the farm buildings, and so the necessity

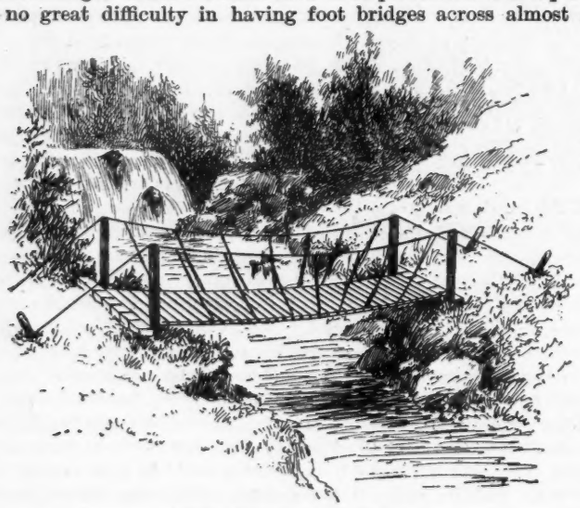


FOUNDATION AND SHED FOR A FARM KETTLE.

arises of building a brick foundation for the kettle out of doors. Such a set kettle should be protected from the weather, for, if it is not, the kettle is soon rusted, and the bricks become loosened by the entrance of water from the top. A good protection is shown in the illustration. The corner uprights are secured to the brickwork by iron straps, one side and the front of the wooden structure being hinged at the top, allowing free access to the kettle. This useful contrivance will be more convenient if the top of the structure in which the kettle is set be of one complete slab of stone, slate or soapstone, but this is not at all necessary.

A SUSPENSION FOOT BRIDGE.

Foot bridges, in both mountainous and nearly level regions, across streams from ten to one hundred feet in width, would often be a great convenience and save going around to cross on some public bridge. Since wire has become so plentiful and cheap there is no great difficulty in having foot bridges across almost any



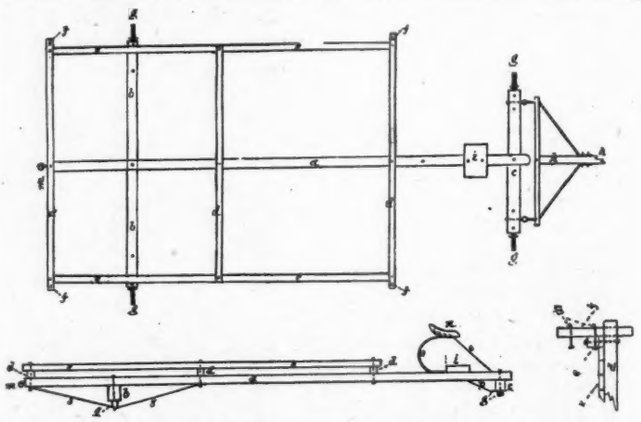
WIRE SUSPENSION BRIDGE.

stream less than one hundred feet in width. Posts are set firmly in the ground from four to ten feet back from the margin of the stream, as shown in the illustration, from a sketch by L. D. Snook. Against these posts is placed a strong piece of timber of some durable wood, around which are firmly secured the ends of the wire intended for the bridge support. A fifty-foot bridge requires eight No. 8 or 9 gauge annealed fence wire placed from six to eight inches apart, always remembering that the shorter and narrower the bridge the less weight in foot boards it will be obliged to support, consequently the more durable it will prove. The wires should not be drawn too tightly, but should have a curve of about ten inches in a fifty-foot bridge. Make the floor of some light, durable wood one inch thick and four inches in width. Commence laying at one end, fastening each end of the board to the outside wire with a staple driven underneath. Place the boards one inch apart.

The posts should be about four feet in height, over which are strung hand wires firmly secured to anchor posts as shown. Short guy wires are placed every few feet and connected with the outside foundation wires; these not only add to the supporting strength of the structure, but prevent the bridge swaying in heavy gales. If heavy stones are placed near the posts for the cross timber to rest against the structure will prove more durable. Rapidly-growing trees planted near the posts may, in a few years, be used to replace them. Where the embankments are low, raise the end timbers so that the foot wires will be in no danger of injury by floodwood during freshets. If short sections of two-inch gas-pipe be used for all the posts and for the end crosspiece, and once in five years the wires are painted where they are wrapped around the end support, the bridge will prove good and serviceable for fifty years.

A HANDY FARM TRUCK.

The cost of the manufactured low-down trucks has prevented many farmers from purchasing and using them. The one shown in the illustration, from a sketch by J. H. Brown of Michigan, is cheaply made, costing about four dollars for iron, lumber, and blacksmith work. The diagrams explain every point so thoroughly that any farmer with a few tools can easily make it. The frame is made of 4x4 inch and 2x4 inch seasoned white oak. The wheels may be taken from two old mowers, those used on the rear axle being



FRAME FOR FARM TRUCK.

somewhat the larger and stronger. The steel shafts from the same mowers may be cut and made into stub axles, bolted on each end of the 4x4 inch oak axles. Collars are to be put on, holes drilled, and cap washers made to hold the wheels in place. The axle *c*, above, is two feet nine inches long; axle *b* four feet three inches long. The reach *a* is 4x4 inches by ten and one-half feet long. It rests on top of the front axle, and a hammer strap, *p*, below, runs underneath. A kingbolt, one inch in diameter, runs through all three, holding them securely in place. About one-half inch is cut out of both rear axle and reach, at their intersection, making a tight, square joint. A one-half inch bolt is put through the center. The reach projects three feet back of the rear axle. The crosspieces *d*, 2x4 inch by four feet six inches long, are next bolted on at right angles to reach. Two pieces, *e*, above, are next laid on top of the three crosspieces, *d*, and bolted about four inches from the ends. This leaves room for mortices, *f*, to be made for stakes. Now level up the frame and measure for the braces, *s*. These are made of flat iron bars one-half by one and one-fourth inches. This stiffens the whole frame and makes the platform solid. It also prevents the front end of the platform from twisting. A truss rod may be put under the reach, but long experience finds no need of it. About three-fifths of the load rests on the rear wheels. The outside pieces, *e*, 2x4 inches, are bolted on edgewise. Side boards should rest on top

of these pieces and against the stakes *f*. The stakes may be raised full length when hauling rails, and lowered when not in use. At right is shown one corner of platform; *w* shows the two clamps, made of bolts with heads cut off, and curved around to hold the stake. The lower clamp holds the stake in position. The upper clamp is to hold the side board when needed; *x* represents the flooring, one inch thick. The platform of this truck is seven and one-half feet long and four feet two inches wide. As made, one can turn very short in front of platform. The tongue was taken from an old binder, and braces attached, as shown. The seat, *u*, and spring, *o*, came from an old reaper, and is aboutforty years old. The tool box, *i*, holds wrenches, clevises, nails, pincers and oil can. In the rear of truck is a ring, *m*, for attaching drill, disc harrow, or other implements, if needed, to save extra trips.

PROPERLY SHAPED OPEN DITCHES.

Upon cultivated land wherever underdrains can be made to properly absorb the surface water, they should be placed in position. There are, however, many sections of open fields where open ditches

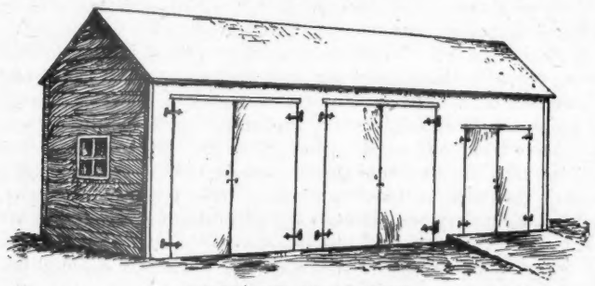
FIG. 1. BADLY-SHAPED DITCH. FIG. 2. PROPERLY-SHAPED DITCH.

are a necessity, as the rainfall draining from an adjoining area is so great that the small underdrains are entirely inadequate to remove it, in consequence of which the crops are damaged, or the fields are badly washed. Various forms of open ditches are shown in the illustrations. The usual form of such ditches (Fig. 1) is made by the farmer in a mistaken notion of economizing land. He makes the ditch about three feet wide at the top and as deep as the walls of the ditch will stand without caving in at the time of construction. The consequence invariably is that during a heavy rainfall the water being confined to so narrow a channel deepens and widens the ditch far beyond its original dimensions, and the sides are left too steep to grass over. Hence, during winter, the action of frost causes the sides to crumble away, and present a ragged appearance, at some points being washed and caved in to twice the original width. Such a ditch is so deep and steep that one cannot safely cross it with any of the farm implements. The proper form of construction (Fig. 2) is made about six feet wide at the top and about one foot deep, which is half the usual depth. This will grass over in one season, thus preventing washing. The grassy sides and bed will grow good hay or afford excellent pasturage. In fact, the grass roots being damp, will give an enormous top growth. The shallow ditch can be readily crossed by the mower or binder, besides giving it a more presentable appearance at no greater outlay.

THE CARE OF FARM IMPLEMENTS.

WEBB DONNELL.

There are farmers who leave their tools exposed to the action of the weather for twelve months of the year, but, fortunately, these are comparatively few. There are, however, a great many farmers who, at the opening of spring, bring forth their tools from



CONVENIENT TOOL HOUSE.

safe winter quarters and for six months or more expose them to the action of sun, air and rain. Tools used one day are left in the field, or out of doors, for expected use on the coming day. These expectations are frequently not realized because of rain or dull weather, during which these implements of iron, wood and steel, suffer constant depreciation. It is a slipshod method to leave tools lying about out of doors during the season of farm work, and this practice goes a long way in leading to the conviction that "farming doesn't pay." No business man could afford to thus expose his machinery or stock in trade. In fact there are very few business operations in the country that could survive such wasteful practices as are to be seen on many farms. A little effort will soon establish the habit of putting tools in a safe and proper place when not in use. Thus the implements will be preserved; it will always be known where to find them, and much time will be saved that is now spent in hunting for them. It will wonderfully assist to secure all these advantages if a separate tool house is provided, a building that is given wholly up to the housing of all the farm tools. The illustration accompanying this shows a conveniently arranged tool house, where all the implements in use about the farm may be secured when not in use. One end of the building is partitioned off and floored where the small tools can be kept, while the rest of the building has an earth floor covered with gravel and entered by two large doors, permitting mowers, rakes, and other machines to be driven into the building. The building can be made of a size to accommodate the larger or smaller number of tools in use upon the farm. Such a building will pay large returns upon its cost, in the saving of tools and in time now spent in hunting them up from all places.

IMPROVEMENTS IN WELL-DIGGING.

GEORGE G. GROFF, PENNSYLVANIA.

A novel idea in well-digging was brought out recently in the discussions at a Pennsylvania Farmers' Institute. It was admitted by all that a bored well was easier to keep clean from surface filth

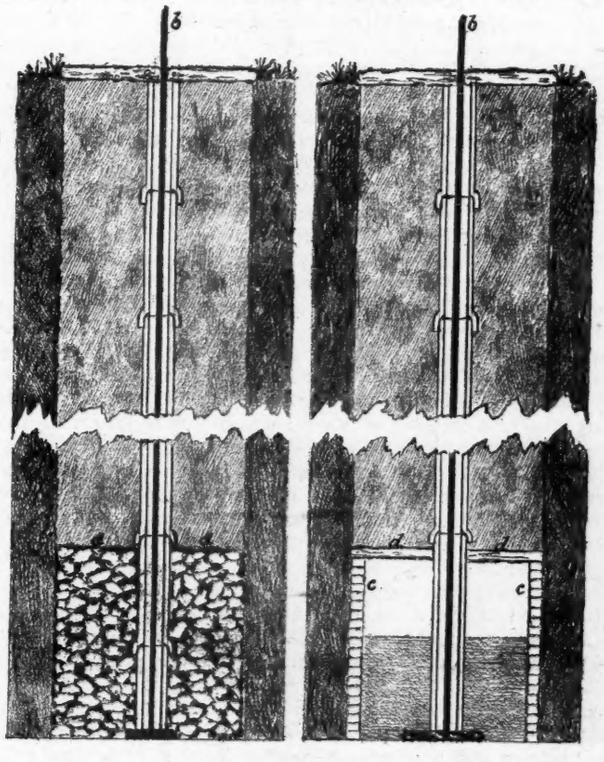


FIG. 1. IMPROVED WELLS. FIG. 2.

than a dug one, but the unanswerable objection to the bored well was that it often would not furnish a sufficient supply of water, especially in a dry season. A gentleman present then gave his plan to combine the advantages of the dug and the bored well in one. The plan is as follows: A well of large diameter is dug. Terra cotta pipe of six or eight inches diameter is secured of a length to reach from bottom to top of well (Fig. 1). Ten or fifteen feet of this pipe is set up on the floor of the well, resting on a flat stone in the center of the well. For a distance a considerable higher than the usual water level in the well, the space around the terra cotta pipe is carefully packed with stones gathered from the fields, or other convenient place. When a sufficient reservoir has been formed of loose stones, the top is leveled off, some clean straw, *a*, laid over all, and the earth taken from the well is replaced. As the earth is thrown in, the terra cotta pipe is added joint by joint until

the surface of the ground is reached. The pump, *b*, is inserted inside of the terra cotta pipe. The gentleman stated that he found this reservoir large enough for all purposes, but that he had tried another plan, making a larger space for water. The first ten feet of the bottom of the well (Fig. 2) was walled up in the usual way, *c*. On top of the wall, large flat stones, *d*, were laid, forming a floor on which the earth was filled in. The terra cotta pipe extended from the bottom of the well to the surface, as in the first case. The advantages of this well are: 1. Little danger from surface contamination as compared with the ordinary dry and walled well. 2. A considerable reservoir for the water so that the well will serve all farm purposes, being in this respect better than a drilled well. 3. No expense for stone or brick to wall the well, this often being an item of considerable amount. 4. A place in which to deposit the refuse earth, this often being a great convenience. It was stated that no trouble was had in removing the pump stock from its terra cotta casing, and that the wells were a complete success.

TOPDRESSING WINTER GRAIN.

HENRY STEWART.

With the corn and the potatoes and other pressing work at the time of sowing the winter grain, there is often scarcely time to put any manure on the land. But often without manure the crop will hardly pay with the present low prices. Under these circumstances the rule should be to get the largest crop possible from the least ground, so as to limit the expense and increase the income. It is thus that the farm is made to pay the best even under adverse conditions of all kinds. And thus it is very desirable to give as much manure to the fall grain as may be possible. By topdressing the grain, as soon as possible after the seed is in the ground, this aid to it may be given, and generally with more benefit than if the manure had been plowed in with the delay of several days in getting the seed in. Thus, topdressing is really better than turning under the manure before the sowing, for it puts the food for the crop just where it will do the most good, which is where the young roots will get it in the shortest time by being carried down to them by the rains. Moreover, the young plants are protected from the sharp frosts that often throw them out by the roots, and this benefit exists all through the various freezings and thawings of the winter.

Coarse, strawy manure is the very thing for this purpose. It affords the most protection to the young plants, and as it lies close to the ground it shelters them from the cold winds, and where the snow covers the land it gathers it as it is swept along by the gusts and keeps the plants warm. The sooner this work is done the better, but better late than never, for it will be useful even if applied after the ground is frozen. It is not the freezing that hurts the grain so much as the thawing, and once the ground is frozen it is wise to keep it so by a covering of something, so that the alternate freezing and thawing by which the plants are drawn out of the ground may be avoided. The earlier it is applied, however, the more vigorous will be the growth both of leaf and roots, and the better able the plants will be to resist the destructive effects of these repeated and injurious changes of the weather.

Many farmers have found by experience that topdressing is the best method of applying the manure under all circumstances. The plant food is given where it must be the most available, and will reach the roots, which are mostly near the surface, immediately. It comes the nearest to the natural methods, for in nature all the plant food that the land receives is by the annual topdressing with the leaves or the withered herbage that falls on the ground at this season of the year. And if the student of nature who loves to perceive how admirably things are fitted to each other will, in the depth of the winter or early in the year, when the warmth of the soil, preserved by this natural topdressing, starts the first green leaves and the earliest blossoms of the spring, search under the covering, he will find these nestling under the protecting blanket, and the sweetly-scented mayflower will reward his search as he finds it lying snugly under its protecting covering. He will see, too, in the woods, these leaves, which cover the first tender blades of grass, pushed aside by the wild animals or the sheep, who have learned or are taught by instinct to find their food thus prepared for them, at the time of scarcity, when it is most needed.

Fencing in Winter.—There is often plenty of time, after the so-called fall work is completed, to do a good deal that is usually left till spring. The fences can be looked over and repaired. Posts can be set to much better advantage than in the spring, as the soil is in better condition for such work. It pays to see to the fences. If neglected, they will soon fall into a dilapidated condition which it will require a good deal of work to bring them out of. And a broken-down fence is a disgrace to any farm, and a standing reflection against the owner of it. One reason why so many shabby fences are seen is that the work of repairing them is left till spring, and then there seems to be no time for such work. Do it while there is leisure, and you will be more likely to do good work.

WINTER CARE OF DAIRY COWS.

GEORGE E. NEWELL, NEW YORK.

Kindness is worth dollars in the dairy. The man who shows kindness to his stock will be a great many dollars better off than one who is harsh and rough with the cows, or even indifferent. This is not sentiment, but a practical fact, and the writer has seen it exemplified in dairy work many times over. Dairymen who conduct their business on a broad and thorough basis, raise their own heifers, from calves bred on their own farms. During the winter season, many of these heifers are approaching maternity for the first time. They will soon become new-milch cows, and it means a great deal to the owner whether they will become profitable property to him or not. Now kindness exercised toward these gentle dumb brutes will have a great influence in making them profitable the following summer, and for succeeding summers. This is written from the standpoint of experience in this matter, not theory. It is one thing to give a cow only a warm stable and plenty to eat, and another and very important matter to cultivate the good will by kind attention. Cows like to be curried, and will stop feeding any time to enjoy the agreeable sensation of a currycomb or card on their backs. An ordinary ox card is excellent to use for this purpose, and any one can soon make friends with a shy cow by using it gently on her back and flanks. A daily currying is a means, also, of keeping the cows in good health, besides adding to their sleek appearance.

A truly profitable cow must be a gentle cow, and the time to keep her so is when she is a calf or heifer. A cow will soon put confidence in a man who speaks to her gently, and pats her side or head in passing. Some dairymen tell a great deal about "breaking in" a heifer to milk, but the man who is already on good terms with his heifer knows no such ordeal. He has petted and caressed the creature daily in the stable, when feeding and caring for her, and when he sits down to milk her for the first time, she looks meekly around and submits to it as a matter of course. The winter time offers an opportunity for the dairyman to get thoroughly acquainted with his cows, study their characteristics, and bring out their good points. It really costs less labor, money and time to keep a cow stable in good condition from December to May than to let it go as a mere dirty cattle shed. By the latter is meant the long basement found under many a hay barn, with dilapidated wooden doors at either end, the cows standing or partly lying in the frozen litter of a day's accumulation. It is of no avail to pet a cow in such a place. The kindness would consist in first making the apartment tight and warm, cleaning out the stable daily, and bedding down the animals. This is not expensive treatment in the matter of time, labor, or money. Care and kindness are the two great things that go to make up the successful treatment of dairy stock at any time of the year, and in northern latitudes, especially in winter. Besides having pleasant relations established between these young animals and those who care for them, they should undergo training preparatory to their future milk giving. Those who care for them should handle their teats in imitation of the real milking that they must soon learn to submit to. This will do away with that so-called "breaking-in-to-milk" period, which is such a trying ordeal to those dairymen with shy, wild heifers. Not only is it a matter of convenience at the start, but a quiet beginning in milking a heifer, followed by continued mild treatment, means absence of trouble through future milkings. Animals cannot reason, but they are all amenable to kindness, and those dairymen who display this trait in the handling of their cows will receive the greatest pecuniary reward with the profitable milk and butter.

Comfortable Shelter.—Look over the barn and stables, if you have not already done so, and make sure that everything is in shape to minister to the comfort of your animals for the winter. If you wait until the coldest weather comes, such work is quite likely to be poorly done. It is always a good plan to do all the work possible in advance of the season, when it can be done without hurry, and before the demand for it becomes pressing.

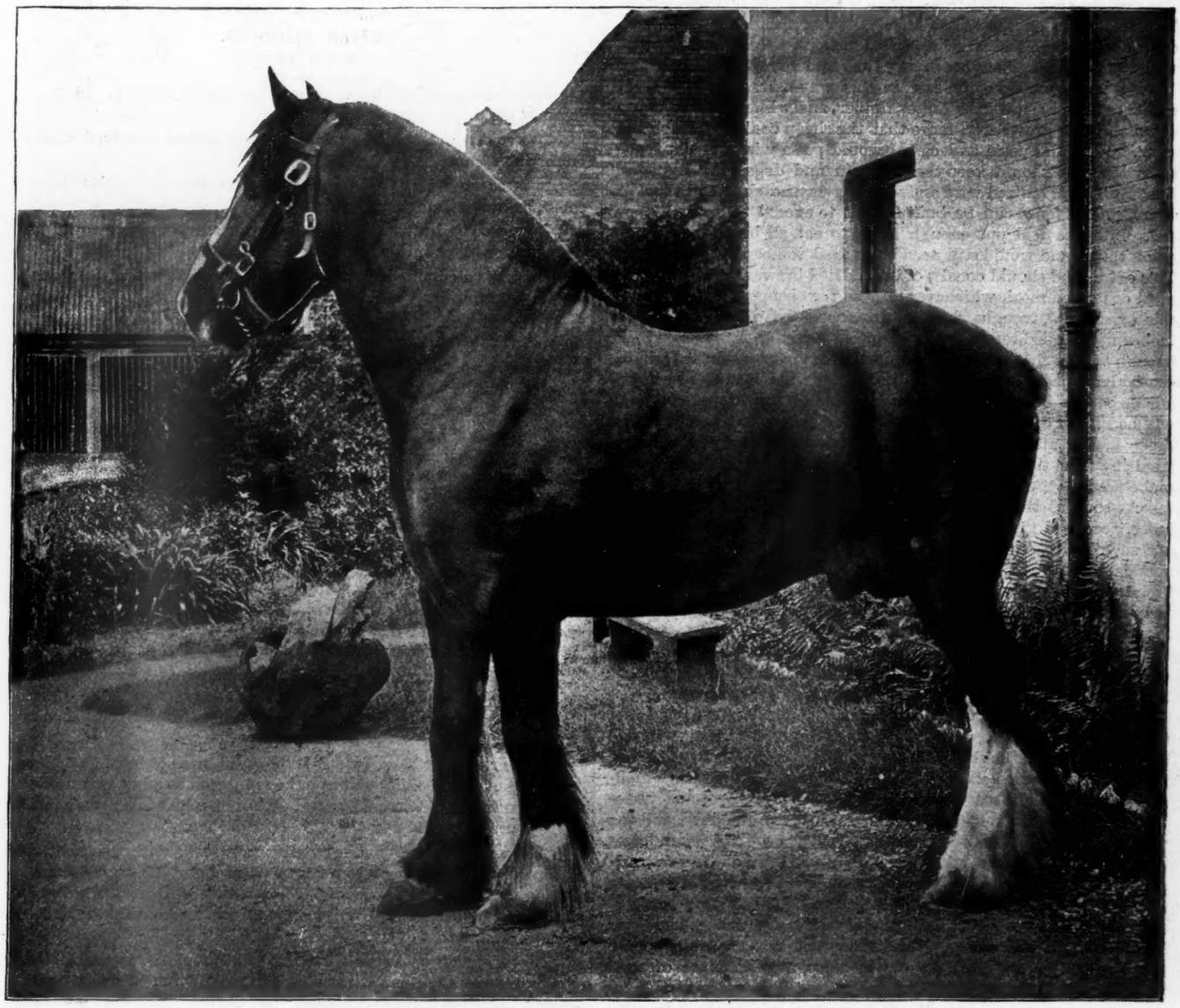
GROUND FEED FOR STOCK.

For young stock as well as for animals advanced in years to that period when their teeth are unable to perform the important office of thorough mastication, ground feed is sooner and better digested than whole grain. Not infrequently animals with good teeth eat so fast that no small amount of grain passes into the stomach without being broken, consequently but little of the food elements contained in such unbroken grain is absorbed in passing through the system, as the acids of the stomach in both horses and cattle, though strong, do not eat away the outer tough covering of all the corn, oats, barley, or other whole grains. If the grain is broken, even in coarse pieces, the digestive apparatus would soon have changed the condition of the gluten and germ of the grain. If ground feed be fed in the dry state it cannot be eaten faster than the saliva will moisten it, and is more readily digested. Horses that are allowed but a short time to eat their morning or noonday rations should be fed ground feed that has been moistened at the rate of a pint of water to six quarts of feed, and if the dry feed be thoroughly mixed with cut hay, and dampened, they will be able to eat twice the quantity in a given time than if both articles were fed dry. For horses that are doing heavy work this is a very important matter, as the action of the muscles in grinding their own food is a tiresome operation, and if allowed to perform it in half the time, the remainder may be passed in needed rest. Many farmers who have steam outfits for threshing purposes, have purchased a portable feed grinder, placed the whole under shelter, and give notice that on certain days each week they will grind feed. Thus, in thickly settled sections, a farmer has to haul his grain but a little ways to have it ground. Often those who have a windmill attach a grinder, and during the windy weather of winter and spring grind their own feed, or they use a sweep or tread power.

AN ENGLISH SHIRE PRIZE STALLION.

F. C. CHAPPELL, ENGLAND.

The accompanying illustration, from a photograph taken especially for the AMERICAN AGRICULTURIST, represents Castern Harold, the three-year-old English Shire stallion which won the first premium at the recent show of the Royal Agricultural Society at Chester, England. The owners, T. Lowndes & Sons of Rolleston Park, state that this stallion has now more prizes than any other three-year-old in England. The Shires resemble the Clydes in being large and massive, muscular and large-boned, rather than fat and rounded. The crested neck sits proudly on the sloping shoulders and deep chest. The back is short and the loins powerful, with magnificent quarters. The legs are feathered with long, shaggy hair from the hock to the pasterns. They constitute the draft horse of the English counties just as the Clydesdale is the working horse of Scotland. A large number of Shire horses have been brought to America, and their progeny is becoming popular, showing as it does all the prominent characteristics of this remarkable breed. The Shires, like the Clydes, are fast walkers, and stand road work and slow teaming so well that they are especially useful



THE PRIZE SHIRE STALLION CASTERN HAROLD.

for the great and increasing amount of heavy hauling over stone-paved streets, which is necessary in the cities. Of this useful class of horses, Castern Harold is a typical representative, and his fine form attracted a great deal of attention at the Royal Show, which is one of the most important exhibitions in the United Kingdom.

SHEEP RAISING ON LONG ISLAND.

J. S. WOODWARD.

Many thousands of acres of the now unused wild lands of Long Island, N. Y., could no doubt be profitably used as sheep pastures, and by this means and the use of phosphates and potash, be made to produce paying crops. Three things this land seems to lack, potash, phosphates and vegetable humus, and, quite likely, also, nitrogen. The experiment to utilize these lands is well worth trying. I have been told when on the Island that much of this land can be purchased at a mere nominal price, or can be leased for a term of years with the privilege of buying at any time at a named price.

My plan would be to lease in this way a tract of this land, make posts and slats of the larger timber, and while doing so to lop down all other growths so large that the sheep could not reach the same. With the posts and slats I would put a wire and slat fence around it that should keep the sheep in and dogs out. By using light No. 10 galvanized wire and weaving in the slats eight inches apart, such a fence can be built for not to exceed thirty cents per rod. Into this field put enough sheep to eat all bushes and every green thing, and would still need extra feed to keep them thriving. This extra food should consist of bran, dried brewer's grains, gluten meal or linseed meal, whichever may be the cheapest. For feeding this extra food, troughs should be made of boards nine and ten inches wide nailed together V-shaped, with feet or legs put on long enough so that the sheep can not turn them over; and the troughs should have no ends so as not to hold water when it rains; by being a little careful in feeding and leaving ample trough space no food will be shoved off the ends and wasted. This would result in the sheep killing all timber growth in one season, and the manure resulting from the consumption of the extra food would enrich and make possible the seeding of the land.

As soon as the fall rains commence, blue grass, quack grass, redtop, orchard grass and white or Dutch clover should be mixed and sown in liberal quantity, and the land should have at least 200 pounds muriate of potash, or 600 pounds of kainit per acre, sown broadcast. It might be well to try on limited areas bone dust in varying quantity from 200 to 600 pounds per acre. The feeding of the foods named would furnish a good deal of nitrogen to the soil and also produce needed humus, and the potash and phosphoric acid would stimulate the growth of the grasses, and doubtless in a short time would feed a large increase in the number of sheep.

The important question here presents itself: Can this be made to pay? The present uncertainty in the markets generally has been disastrous to the sheep industry. Though the foreign price of wool has not lowered any—in fact has advanced slightly—our manufacturers have refused wools except to meet immediate and pressing demand unless they could buy at prices less the duty, and the result has been that prices have dropped about that much lower than last year. As a result sheep growing has had a bad setback, and sheep can now be bought cheaper than for many years. At times since September first, good, healthy ewes of from three to five years old, somewhat thin, but good for lamb raising, have sold in the Buffalo market as low as one and one-half cents per pound. Of course, even though very low in price, a good fleece of wool will help on the right side of the ledger, yet it is not advisable for any farmer, near the large cities at least, to embark in sheep keeping for wool alone. Mutton must be first considered, and he must strain his best energies in this direction.

The moment any sheep, not a ewe for lamb production, is kept after maturity, it is kept solely for the growth of wool, so the farmer on Long Island who would try the way previously indicated must so plan as to put his sheep into the mutton market as soon as their growth will not pay for what they are costing to keep. To do this let good, strong, healthy ewes of merino blood be selected, from two to four years of age, and these be mated with a Dorset or Hampshire or Shropshire ram, and at such a time as to have lambs dropped, on Long Island, not later than March or the very first days of April. Let ewes and lambs be well fed both before and after going to the pasture, and sufficiently well fed; they will be ready to market when Long Island is thronged with its summer visitors, and will bring not only New York prices, but these with the freight added. For the reason that the lambs will sell as indicated for more than ewes will cost, it will not pay to keep any of the ewe lambs to replenish the flock. The poorer ewes and such as get too old should be annually drafted out, fitted for market and sold, and their places filled with fresh ones. For the reason that the character and flavor of the meat of all animals is greatly influenced by the food eaten, it is more than likely that lambs raised and fed as above on the wild pastures and herbage of Long Island would soon become famous and bring an extra price. The excellent mutton of the Welsh mountain sheep, raised and fattened on the peculiar herbage of the mountain highlands of Wales, sells in the London market for several cents per pound more than that of any other sheep. There is no doubt that there is renovation for these now worthless Long Island lands and money in the pocket of those who will intelligently engage in the sheep industry there.

BUTTER GLOBULES.

E. N. GEORGE.

Never set milk or cream in a cellar where there is the least smell of mold.

To avoid white specks in butter, keep bits of loppered casein out of the cream.

It is as necessary to have thorough ventilation in the dairy-room, as in the living apartments.

Do not color butter deeply unless your market demands it. A deep orange-hued butter is unnatural in color.

Butter is a commodity that is not liable to sell beyond its value; that is, poor butter is not going to bring a good price.

Even if you can "guess" on temperature to within half a degree, always use a thermometer in cream before churning.

Makers who never forget the fact that butter is a conglomeration of delicate fat globules, and who handle it accordingly, are the successful ones.

The care of butter does not end with its being packed in tubs or jars. The packages should be kept stored in a cold atmosphere, kept pure by ventilation.

Butter must be pleasing to the eye, as well as acceptable to the taste, to bring customers. Scrupulous neatness in butter-making requires no capital, and yet returns a splendid income on the investment.

If there is any dirt in cream it is pretty sure to become incorporated with the butter, instead of passing off in the buttermilk. Straining the cream just before churning time should be regarded as a necessary precaution.

Do not fill the churn nearly full of cream and expect that it will separate into butter expeditiously. There must be free room for the cream mass to break and rebound under the force of concussion as the churn revolves.

Butter tubs or jars, before being used, even if new, should be scalded out with boiling water, or be subjected to a hot steam blast, and then immersed in cold water. They should be cold and moist when butter is packed in them.

The creamery that makes butter nowadays without using the Babcock test ought not to receive patronage. This may seem a strong statement, yet without the use of this test the rich milk of a fine breed of cattle, well fed, brings no more than that yielded by scrubs, with a diet of straw.

Never guess at the salt used in salting butter, any more than you guess at the temperature of cream. Weigh it down to the ounce, after you have weighed the butter. Many experienced makers daily "lump" these articles off, because they think experience makes them technical guessers. Such a method is unscientific and dangerous. When you wash butter after the salt has been put in, as some do, uniformity in this line becomes impossible. Work butter continuously to incorporate the salt, and press it firmly into the tubs in packing, not violently pound it in.

When washing butter in the granulated state, do not stop washing till the drainage has lost its milky cast, and runs clear. As a wise precautionary measure, strain the water before you wash butter with it. A case came under my observation recently, where $50 was lost to a creamery through sand in the butter, coming from well water supposed to be pure. If the water is suspected of containing organic contamination, as is frequently the case with shallow creamery wells, send a sample to a chemist to be analyzed, and while awaiting the result of the analysis, sterilize all the water used.

A MODEL HOUSE, COSTING ONE THOUSAND DOLLARS.

To the practical home builder who is expecting soon to erect a house of modest pretentions, there was much interest centered about the designs and models for workingmen's houses at the Columbian Exhibition, and to such the study of the model home in connection with the New York State exhibit, and designed by the Pratt Institute, Brooklyn, N. Y., will be profitable in the points of economy gained by the investigation. This building is a story and a half frame house, twenty by twenty-eight feet upon the ground, and contains all the necessary conveniences for the country or village home of a small family. This house, according to the specifications, should not cost over $1,000. The accompanying illustrations present the first and second floor plans, as well as the elevations of the building, giving a clear idea of its construction. At the left-hand corner of the front end one enters the house through a nearly square porch, set in a recess at the corners of the house; a window in the front door lights the staircase hall, which runs back twelve and one-half feet to a side entry, affording easy access to the kitchen from the side door. At the right of the hall is a good-sized living room, thirteen by fourteen feet, lighted by three windows and having a fireplace and china closet. Immediately at the rear is the kitchen, of the same width, and twelve feet three inches in depth. From the rear of the kitchen a pantry opens, with shelving on three sides; near the pantry door is the sink and drain board, located here to be economically near the plumbing of the bathroom, which opens at the rear of the entry. These rooms are eight feet high, with windows about five feet in height. Under the staircase are the cellar stairs. Ascending to the second floor we find three chambers, eleven feet six inches by thirteen feet, ten feet by twelve feet three inches, and eight feet nine inches by twelve feet three inches in dimension, respectively, the front room having two large front windows and a half-light under the side roof, while the two rear rooms have a large and small window in each. The front and larger back rooms have closets, and at the front of the hall is a larger, lighted closet, nearly square. The frame is built of hemlock lumber; the sills are six by eight inches, with a beam supporting the main partition wall eight inches square. The bill of estimates includes eighty yards of excavating and twenty-five yards of masonry for a good-sized cellar, lighted by four windows; but this would vary considerably, according to the location. Forty-two transverse floor joists are required for the two floors, their dimensions being two by nine inches. These are doubled where the studding rests and about the opening for the second floor staircase. Two hundred pieces of studding two by four inches and sixteen feet long are required, with eighteen collar beams of the same length and two by six inches in dimension; the rafters are two by six inches and fourteen feet in length, and rising ten inches to the foot. Twenty-five hundred feet of sheathing are needed for the lining of the building and roof, and eighteen hundred feet of sheathing paper keeps the house warm despite the winter winds. Sixteen-inch white pine shingles are used, and forty-five hundred will be necesary for the simple gable roof, and two thousand feet of No. 1 bevel siding to cover the walls. Fourteen hundred feet of yellow pine flooring will lay the floors, and one hundred feet of yellow pine wainscoting is needed to fit up the bathroom; the stairway is of the same material, being two feet nine inches wide, with eight and one-half inch treads and seven and one-half inch risers. The trim doors and window frames are of white pine, the doors and windows varying slightly in size for the different parts of the house. Two thousand bricks will build the chimney, and eight hundred and fifty yards of plastering will finish the interior. A few incidentals complete the list of materials needed, and the expense of labor will be a matter for the individual to compute, according to his own abilities and the location where the work is to be done, and if one has time and skill to aid in the erection, some of the estimated outlay can be saved. The conveniences afforded in this object lesson must be an impetus to the home-building instincts of the masses who visited this part of the Exposition, as well as a welcome surprise to the many who are familiar with the usual discomforts of the poorly planned and arranged small farm and village houses. With such a house as a beginning, improvements and more commodious extensions can be added, according to the domestic requirements and the means of the builder as his savings accumulate. [Our engraving Fig. 1 shows the front elevation of the one thousand dollar model home in the New York State Columbian exhibit at the Chicaga World's Fair, Fig. 2 the left side elevation, Fig. 3 the right side elevation, Fig. 4 the rear elevation, Fig. 5 the plan of the ground floor, and Fig. 6 the plan of the second story.]

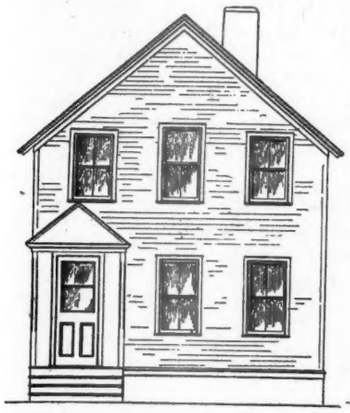


FIG. 1. FRONT ELEVATION.

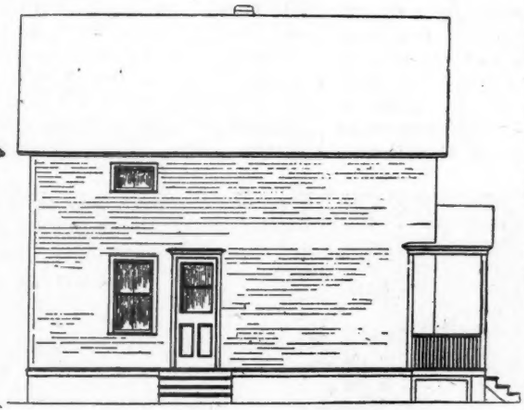


FIG. 2. LEFT SIDE ELEVATION.

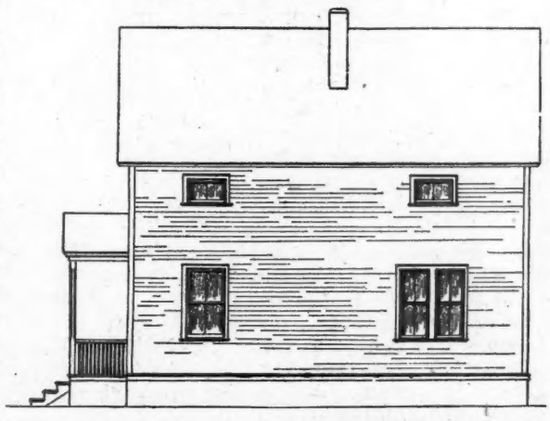


FIG. 3. RIGHT SIDE ELEVATION.

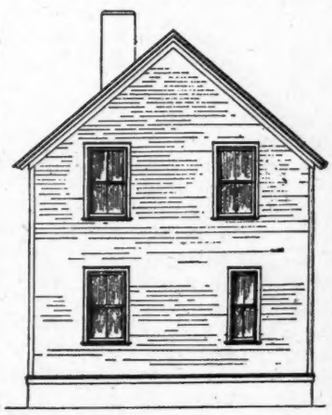


FIG. 4. REAR ELEVATION.

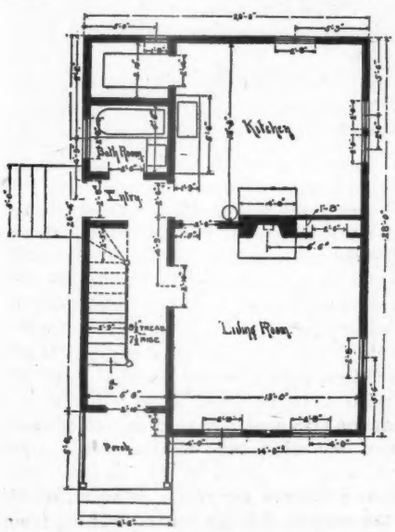


FIG. 5. PLAN OF FIRST FLOOR.

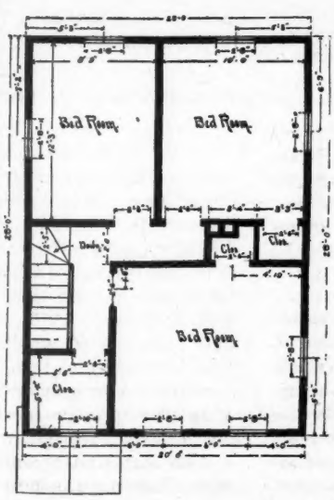


FIG. 6. PLAN OF SECOND FLOOR.

THE JERUSALEM ARTICHOKE.

R. MARION, MISSOURI.

The American artichoke, *Helianthus tuberosus*, commonly known as the Jerusalem artichoke, is a highly nutritious tuber equaling, if not surpassing, the potato in food value. And yet it is rarely seen upon the farm. While not possessing the culinary value of the potato, being of an inferior flavor, yet the nutritious qualities and the facility of its production justify a greater amount of attention than has hitherto been given it. It grows well in poor soil and will thrive where potatoes would utterly fail. While of course a good soil adds to its yield, proportionally with other crops under like conditions, yet where no other product will at all thrive, the artichoke will flourish, and prove profitable. It requires but slight cultivation and will do well without any cultivation whatever. It is hardy in its nature and aggressive in its habits of growth, consequently it can take care of itself against the weeds in first rate order. Moreover, a piece of ground planted with artichokes continues to produce from year to year without replanting. As a culinary article artichokes will prove an addition to the bill of fare. The best method of preparation is to wash the tubers and let them lie two or three hours in cold water. Then put in salted, boiling water and boil them steadily two or three hours, adding boiling water when necessary. When thoroughly done, drain and serve with melted butter. This will prove a delicious dish. It is a little strange that the artichoke is so rarely seen in the market. It is a wholesome and thoroughly palatable vegetable. With me it has been a standard vegetable since my earliest recollection. The long row of tall artichokes by the garden fence with their starlike, yellow blossoms, rivaling in beauty the Kansas sunflower, constitutes one of my most pleasing memories, and I am sure that a tall forest of stately oaks, with an undergrowth of artichokes in full bloom, would certainly form a most picturesque and pleasing landscape.

Fig. 1. A FIJI ISLAND BANANA CANOE.

Build a Woodshed.—Every farmer should see that the woodshed is put in proper shape. Let neatness and order characterize it. Pile the wood away in such a manner as to economize space and make it easy to get at, A woman who has housework to do appreciates few things more than good, dry wood, and this cannot be had unless one has a good place for it. Be sure to have a woodhouse or shed. Let it be near the kitchen, but do not oblige the women of the household to run to the shed every time a few sticks are wanted. Have a neat woodbox near the kitchen stove, and let the children know that you expect them to keep it filled. Wood seasoned under cover is much preferable to that exposed to all kinds of weather.

FARMING IN THE FIJI ISLANDS.

HERBERT STANLEY RENTON.

In fruiterer's windows, everywhere in Australia and New Zealand, Fiji bananas are displayed temptingly at prices ranging from ten to twenty-five cents a dozen. There are some thirty varieties of this luscious fruit in the Fiji Islands, and steamers bring thousands of bunches every month to Auckland and Melbourne from the ports of Suva, the capital, and Levuka. The capital is Suva on the largest island, Viti Levu, which has an area of 4,479 square miles. The area of the entire group of 312 islands is 8,084 square miles, or about as large as the State of Massachusetts. The second largest island is Vanua Levu; of all the islands Taviuni, with its lakes in extinct craters, is the most beautiful. The name Fiji or Feegee is a corruption of Viti, the name of the largest island Viti Levu, the words meaning simply "Great Isle." The facilities for reaching this wonderful group from Sydney or Auckland are excellent, and it is only a three days' excursion from the New Zealand metropolis to the coral strands and banana groves of Feegee. The islands were ceded to England in 1874, the United States having refused them in 1869. Prince George, a son of the famous native king, Thakombau, now deceased, lives in a thatched palace on the islet M'bau, a mere rock off Viti Levu. When a canoe was launched in the old cannibal days, sometimes as many as fifty captives from rival tribes were used as rollers, the ponderous vessel crushing the life out of them as it was rolled along to the water. An interior view of a palace courtyard affords an idea of the wasteful extravagance which has always characterized Fijian customs. Piled up are masses of taro, a purple vegetable not unlike the beet, but growing in swampy ground and much valued as a staple article of food. It looks like mottled soap, and when baked, mashed, mixed with water and slightly fermented it has an acid taste that is highly satisfactory to the brown dwellers in the tropic isles. Immense turtles, of which the natives are very fond, and a stack of sugar cane indicate that rude plenty is prized in this old home of Fijian royalty. A bill of fare has often included seventy turtles, fifty pigs, roasted whole, fifteen tons of sweet pudding, and fifty tons of yams and taro, with kava, prepared from yongona root, for drink! No wonder famine occurred. A story is told of an old king who cooked a mess of fish which was piled up five feet high and was sixty feet long.

Bananas and breadfruit puddings are much relished by Fijians. They dig a hole in the ground, fill the bottom and sides with leaves, and, throwing in the bananas or breadfruit, as the case may be, mash them down by treading with their feet. Covering the mush over with leaves they allow it to ferment for three days. But this

great waste is largely a thing of the past, and times are changed. No one has been eaten in Fiji since 1876, when a few hill tribes relapsed into cannibalism, which had been almost obsolete for twenty years. In battle, these splendidly developed specimens of physical manhood invariably taunted each other, and rival warriors usually threatened to take each other's skulls for drinking cups. These Fijians will not work, so, for many years, natives of the New Hebrides and Solomon Islands have been imported to labor on plantations. Bananas, sugar, coffee, copra or dried fragments of cocoanut are the principal exports. The cultivation of cotton has not paid expenses. Fijian cotton is very fine and light, an aristocratic grade, from which only the thinnest fabrics can be woven. The struggles of the sugar planters would make a sad story if only a tithe of their experiences were told. Fiji is no place for a poor man. The islands have been developed wonderfully in the last fifteen years. But it is a tale of woe. Eighteen years ago fully one-third of the native population died of measles, the disease having been brought to the islands in an English man-of-war. To-day there are about 125,000 natives. They seem to be a mixed race, brown Polynesian and Papuan. Their little gardens—terraces along the water courses and up the sides of ravines—supply them with taro, bananas and yams. The latter sometimes grow nine or ten feet long and weigh one hundred pounds, though the average is not a third of that. Fiji abounds in steep ravines, hills, and precipices. The mountains are but little over 5,000 feet high, but they are wild fastnesses where a white man, even now, might find it uncomfortable among the brown mountaineers, notwithstanding the record of fifteen hundred schools and a thousand churches in Fiji. Along the coast grow the wind-battered cocoanut trees, and on the larger islands may be seen breadfruit trees. Another fine tree is the lofty candlenut or kukuis, with its white trunk and lamb's wool blossoms. Ferns abound, but there is no blaze of color in Fiji. Flowers are to be found in gardens only. One of the most beautiful trees in Fiji is the pawpaw or umbrella tree. The leaves make tough beefsteaks tender when wrapped around them, and are as good as a washing powder in cleansing soiled clothes. A twelve-foot banana leaf is not a bad shelter. The appearance of a banana plantation is a very pleasing sight, and many of the bunches have two hundred bananas on one stalk. An excellent flour is made from bananas, which is especially wholesome for children and invalids. I have often ripened a bunch of green bananas in an hour by putting a barrel over the bunch in the scorching sun. A change from a vivid green to a golden yellow is the result of this simple operation, and the fruit is fully ripe.

The loading of an Australian steamer with bananas is a picturesque sight. A great many bunches are brought down to Suva in canoes, whose mat sails are patterned after the huge leaves of the plant which bears them. Skimming along like birds with yellow wings, these outrigger canoes, dipping their beaks into the sparkling waves and showering the brown sailors with flashing foam, are extremely beautiful objects, and in the old days of cannibal conquest a couple of hundred in a single fleet, faring forth to annihilate some rival tribe, presented a spectacle as fine as the fleets of Persia and Greece. Now fruit is being conveyed to market simply, and the brown warriors are traveling merchants, baling out the water constantly dashing over the bows, sometimes with a cocoanut shell, and again plashing it out with their broad feet. Because of the pressure of population in the old lands, these isles of the sea must receive constant accessions, and in the struggle to make plantations profitable, the picturesque, aboriginal life must lose glow and tone, and the old features will change and finally disappear before the improvements of civilized humanity, but it will be many a year before the taro gulches, the yam gardens and banana patches are given over entirely to the white man with his coffee and his sugar. In Fig. 1 is seen a Fiji canoe, bringing bananas to market; and Fig. 2 presents a view of the royal courtyard.

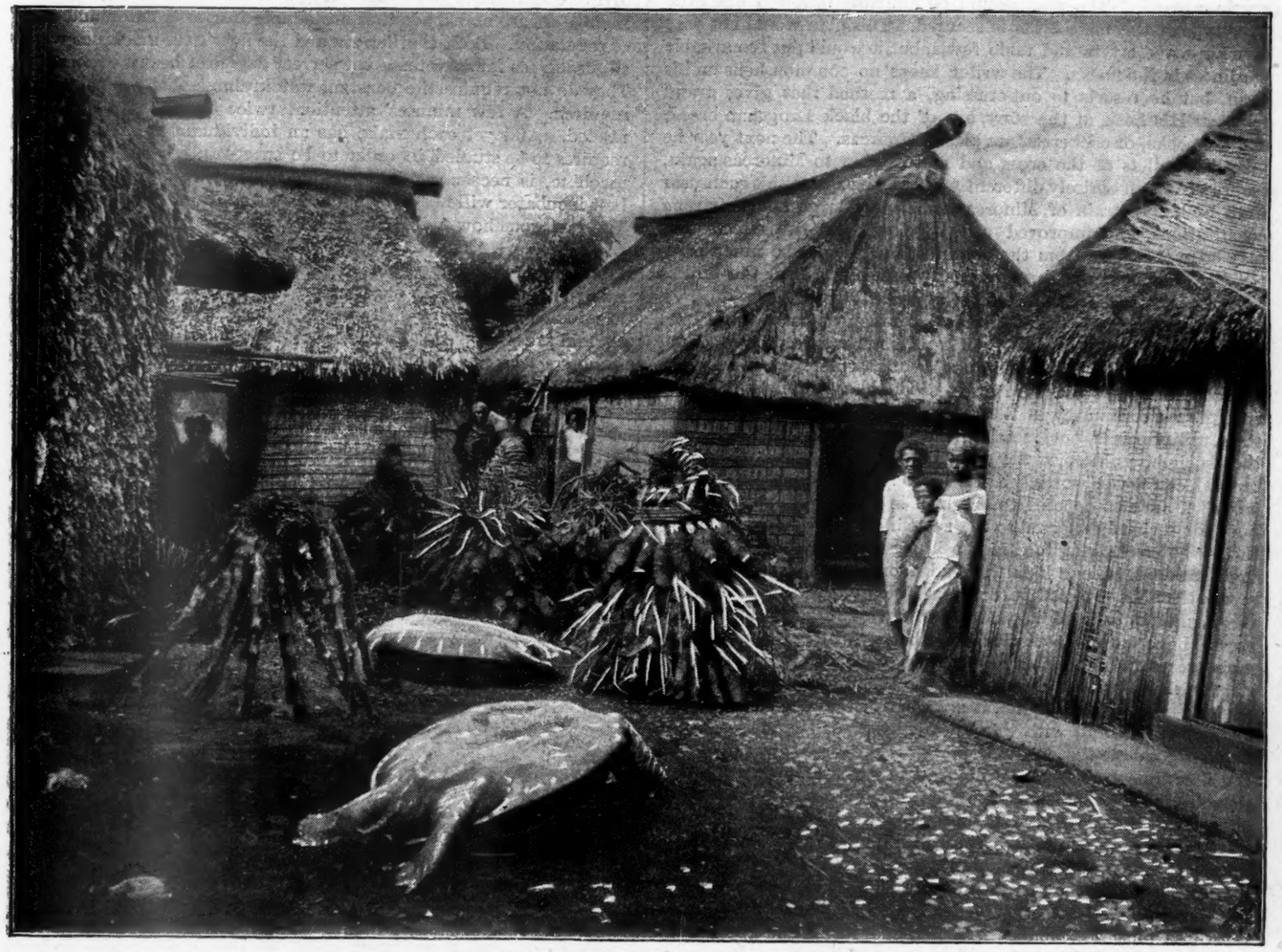


Fig. 2. INTERIOR VIEW OF THE FIJIAN KING'S COURTYARD.

CROSSBRED FOWLS ON THE FARM.

MICHAEL K. BOYER, NEW JERSEY.

The farmer's ideal fowl must be a hardy bird. It must be from good laying and good meat stock. It must be a forager, and it must be adapted to the climate in which it is to be kept. No farmer would be so unwise as to ignore the use of good blood, for his experience with cattle, sheep and hogs has taught him that good blood is the condition of success. Scrub stock will not give satisfaction in the long run. Especially is this true with poultry. There are several ways by which good blood can be secured in an inexpensive way. In the first place, suppose that the farmer has a flock of common fowls; the hens are good layers, and good table birds. He can improve the stock by killing off the mongrel male birds, and investing in thoroughbred males. The following year he should kill off the entire stock, and with the pullets he raised from them pure bred males of the same breed, but not the males of the previous season. The plan should be annually followed until the fixed type of the male birds is secured. This plan would not only give improved layers and table fowls, but it would put remarkable hardiness in the flocks. The writer keeps no common hens on his farm, but he resorts to out-crossing, a method that gives grand results. His hens, at the start, are of the black Langshan breed, and the cocks, or cockerels, are black Minorcas. The next year he takes the pullets of the cross and mates them to Minorcas again, secured from an entirely different family; he repeats this each year until he has a strain of Minorcas that show large bodies, strong constitutions, and improved utility points. All bad effects that may be in the stock from the continual inbreeding, so much practiced by fanciers, are thus gradually remedied, until the bird is made a picture of health instead of a physical wreck.

One great reason why farmers so much object to pure bred fowls is that they are generally of a delicate nature. They cannot afford to have sickly fowls, as these are, as a rule, very poor layers. The condition that the pure breds so often are brought to, in the struggle for supremacy in the show room, has not only weakened their utility points, but greatly damaged their health. It is plain that such birds, despite the good qualities for which they were created, can not be worth the price of the mongrel hen for practical work. I am not opposed to the bird in its purity, by any means; but I am seriously opposed to the system of breeding carried on by those who are striving to gain the highest position on the one hundred scale. I believe it is this endeavoring to obtain the highest scores that has crippled so many useful breeds. For that reason the farmer is justified in refusing to invest in such stock. First crosses have proven themselves to be better for farm work than the pure breeds. And as this first crossing will require pure blood to start with it, can in no way injure the value of thoroughbred poultry. On the other hand, it acknowledges the good qualities of distinct breeds, and with this knowledge the first cross is made; made to combine the desirable parts of two breeds in one carcass. But first crosses must not be bred again with their own kind. If they are to be mated, they should be sired with a pure bred bird of either of the breeds used in their combination.

There are a number of very desirable crosses. In a former number of the AMERICAN AGRICULTURIST I gave the results obtained in crossing the Houdan on Partridge Cochins for broiler and roasting purposes. I have never since been able to find a better cross for those purposes, and can recommend it. I like the cross of black Minorca on black Langshan for winter layers. It gives not only a pretty bird, but one of excellent laying qualities, and one far ahead of any cross I ever tried for winter work. The body is of the shape and size of the Langshan, and the head is that of an ideal Minorca. Samuel Cushman, the manager of the Rhode Island Experiment Station poultry yards, the past year made a number of experiments in crossing breeds, and, judging from his recent report, he believes the Indian Game, crossed on the light Brahma, is in the lead. As a table fowl, such a cross is not easily excelled. I never tried it, but this season have been experimenting with Indian Game crossed on the black Langshan. If anything, I believe Mr. Cushman's cross is better than this one for meat, but I doubt if it exceeds it in egg production. This winter's test should determine of what worth the cross will be for eggs during cold weather. An experiment of crossing black Minorca on both white and brown Leghorns was anything but satisfactory. The offsprings were very puny.

The Orpington breed is creating considerable favorable comment in England, and its merits, as a general purpose fowl, is highly extolled. They resemble our black Javas in appearance, and are made by crossing the black Minorcas, black Langshans, and the barred Plymouth Rocks. Mr. Cook does not say how he began the cross, but it can be made by first crossing Plymouth Rocks on Langshan, and black Minorcas on the pullets of that cross. The cross of white Wyandotte on light Brahma is a good one, making a very good general purpose fowl. Other crosses might be made, but it is not necessary to take up the space now. It must be borne in mind that under no consideration should the cockerels of any cross be used again. Such work only has a tendency to drift towards mongrelism. The pullets are the only desirable part of a cross, and if they are to be mated again it should be with a thoroughbred.

THE VALUE OF INCUBATORS.

B. BUTLER.

The manufacture of incubators has been brought to a point of perfection in the last few years which renders them vastly superior to those that have been the subject of so much condemnation. Incubators are now made that are simple in construction and easy of regulation. Both the hot air and the hot water machines work admirably, so far as securing the correct degree of heat is concerned. They do not require the constant watchfulness that was formerly required. A few minutes' attention, twice a day, is all that is needed. And yet each make has an individuality of its own and requires to be studied in order to be successfully run. Know thy machine, is necessary advice. So far as my experience goes the best incubator will not always hatch so well as the best sitting hen. The hen, somehow, will manage to coax out more chickens than the machine. And yet I confess to a liking for the machine. The labor of attending it is not so exasperating as that of attending many sitting hens. No eggs are smashed by clumsy feet, no nests are fouled by lazy or sick sitters, no eggs are deserted, and no vermin are produced. Even if the number of chickens from the same eggs be less, the satisfaction in caring for the machine is some compensation. If but a few chickens are to be reared, the sitting hen is cheaper; but when many are to be hatched, and especially when they are to be hatched very early when sitting hens are difficult to procure, an incubator becomes a necessity. Whoever buys one owes it to himself and to the manufacturer to observe the directions faithfully and to make a careful study of the conditions of successful incubation. A reasonable amount of intelligence will enable one to run any of the leading incubators in a satisfactory manner, provided his expectations are not too high. But do not hope to obtain, as an average, the exceptionally high percentage that often appears in the testimonials. A hatch of fifty to seventy-five per cent. of the fertile eggs ought to satisfy a reasonable mortal, and such results are obtainable, with the possibility of occasionally obtaining even a much higher percentage.

KEEPING EGGS.

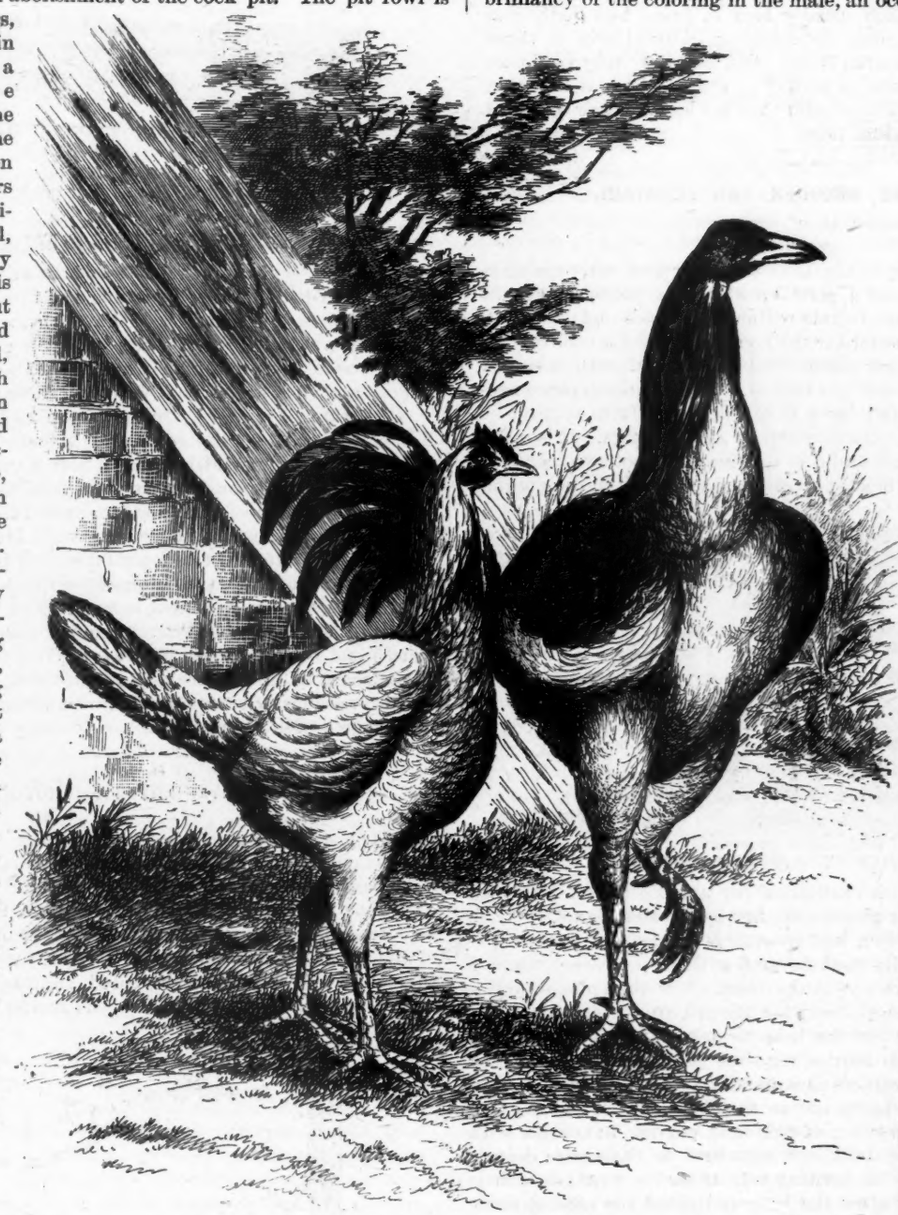
ARTHUR H. JACOB, ENGLAND.

How to keep eggs fresh is a question that should be prominent in the minds of poultry keepers. It may, perhaps, be objected that an egg cannot be preserved so as to retain the natural delicacy of flavor of a really fresh egg, which soon passes away. Still, eggs can be preserved in a manner to leave them excellent eating, and hardly distinguishable from fresh ones except, perhaps, by experts. If eggs are to be kept for a few weeks only, the matter is very easily arranged, a cool place being all that is necessary, together with a board pierced with holes, just large enough to let the eggs stand upright without passing through. Upon this board the eggs should be placed, broad end downward, so that the air space may not enlarge to the same extent as when the reverse way, as there would not be the same evaporation of moisture from the egg. Wire latticing, if well galvanized, can be substituted with advantage for this board or shelf. In Germany, eggs are kept sweet for considerable periods by being buried in fresh bran, or a preparation of lime and water is made by adding twenty gallons of water to four gallons of fine slaked lime, to which about a gallon of salt is added. When the water has taken up as much of the lime as it can possibly dissolve, immerse the eggs in the liquid so that they are quite covered, about two or three inches of water intervening between the outer air and the topmost egg layer. A little lime must be added now and again, as the old lot loses its strength, or gets absorbed. Too much, however, should not be added, else the whole may turn into a solid mass. Water should also be poured in occasionally, as the quantity gradually becomes reduced by the steady absorption.

THE RED PYLE GAME.

H. S. BABCOCK.

The origin of the Game fowl, as such, is involved in mystery. That it is a descendent of the *Gallus bankiva* is generally admitted by all naturalists, but in what country and at what time it was domesticated and modified into its pit form is not known. All that is known is that it has a long history, and that very many nations in very ancient times have bred and fought Game cocks. The Lydians, the Persians, the Romans, the Grecians, and probably the Early Britons, were admirers of the Game fowl. But the exhibition type of the fowl is of more recent production, and has been brought about since the legal abolishment of the cock pit. The pit fowl is shorter on the legs, longer and softer in plumage, with a longer and more bushy tail than the exhibition Game. The change that has been wrought by fanciers is a marvelous testimony to their skill, and to the plasticity of the fowl. How this was brought about has not been disclosed by written record, but selection, with probably an infusion of Malay blood, would be sufficient to account for the change, and probably it was in this manner that the change was produced. The modern Exhibition Game has a very long head, long, slender, snaky looking neck, broad shoulders, prominent wing fronts, a back that slants downward in a straight line to the tail, and is flatiron shaped—that is, broad at the shoulders, tapering as it approaches the tail; a breast that does not extend much, if any, beyond the wing fronts; a very narrow tail, carried just above the horizontal line; long thighs and long shanks. The male and female can be described, in respect to shape, in almost identical words. The male, however, is exhibited without comb, wattles, or ear lobes, these having been carefully removed with a pair of dubbing scissors. The female is shown undubbed, and has a small, upright, single comb, rather small wattles, and ear lobes to correspond.



PAIR OF RED PYLE GAME FOWLS.

Among the several varieties of Games the shape required is the same for all, the nearest approach to the standard requirements being exhibited by the Black-breasted Red and the Red Pyle. The Red Pyle game cock has the plumage of the head varying in color from bright orange to chestnut; hackle of the same color; back crimson; breast white, narrowly laced with chestnut, the shafts of the feathers showing the same color; body white, wing-bow crimson, wing-bar white, wing-bay crimson, making a crimson wing transversed with a white bar; tail with sickles and courts white. The hen has a chestnut head, white hackle edged with yellow, white back, salmon breast, white or chestnut tinged wings, and white tail. The shanks and feet of both sexes are willow or yellow. Personally I prefer the latter color. When the red on the cock is rich in hue the markings are extremely striking, and the fowl is justly regarded as very beautiful. It will be noticed that a Red Pyle Game is marked very similarly to a Black Breasted Red, white being substituted for black. This fact helps us to understand how the peculiar markings were produced, for when a fowl of the Black-Red type is crossed with a white one, the black disappears in the progeny, while the red remains. And it was, undoubtedly, by breeding Black-breasted Red and White Games together that the Red Pyle was produced. Even to this day, in order to keep up the brilliancy of the coloring in the male, an occasional Black-red cross is resorted to with these fowls. Games are not very hardy fowls, for to produce their fine points much color-breeding has been resorted to. But inasmuch as the Red Pyle is the product of a cross of two varieties, and is frequently recrossed to keep up the richness of color, it is reasonable to suppose that it is the hardiest of the Game varieties, and certainly inferior to none in size and practical qualities. If one wishes to select a variety of the Exhibition Game for practical use, he will make no mistake in choosing the Red Pyle. Game fowls, despite their long legs and necks, are really excellent fowls for the table, being particularly plump and well developed in breast and body. Some imagine that to have a good breast development it is necessary for the breast to be carried forward prominently. Crop is thus often mistaken for breast. The fact is, the breast meat lies along the keel-bone, and that is carried under the fowl and a portion of it between the legs. Then, too, the carriage of a fowl makes some difference; the one with an upright carriage, like the Game, disclosing less of the forward prominence of the breast than one which carries its body horizontally. Although Game fowls, owing to the shortness of the plumage, look small, they are really of good size, and it is not difficult to get cocks that weigh from six to eight pounds among Black-breasted Red and Red Pyles. Even heavier weights are sometimes reported.

The old-fashioned Game was an excellent layer, high records having been repeatedly reported, but the modern Exhibition Game has not fully kept up the reputation of the breed. Still, the hens are fairly good layers of medium-sized eggs. The eggs are excellent in quality; none are superior. The hens are good sitters, and extremely careful mothers. They are inclined to be somewhat savage to the broods of other hens, and therefore a Game hen with

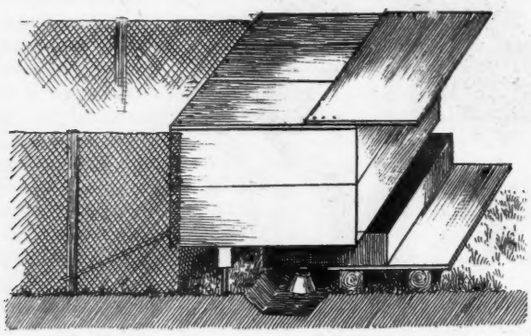
chickens should not be cooped very close to another hen with a brood. For their own chickens they will fight anything, from a rat to a hawk. They are quite capable of defending their young against stray cats, if they are allowed to run with their chickens.

But while the Game can be kept as a profitable fowl, it is kept almost exclusively as an ornamental bird. And upon no one of the descendants of the wild *Gallus* has more skill, more time, and more money been expended. In England five hundred dollars have been repeatedly paid for a winning cock, and though, in this country such prices have not been reached, one hundred, and in one case one hundred and fifty dollars have been paid. I remember of seeing sold, at an exhibition held in Indianapolis a few years ago, two cocks and one hen for three hundred dollars. These were Black-breasted Reds, which usually lead in price, but Red Pyles command very high figures, approaching quite closely to those realized by the Black-breasted Reds. And certainly they ought to, for they are nearly or quite as perfect in shape, which is the main thing in a Game fowl, while in color they are less or more beautiful according to one's individual taste.

A HOMEMADE BROODER AND FOUNTAIN.

HOLLISTER SAGE, CONNECTICUT.

The artificial rearing of chickens in winter and early spring is almost impossible without a good brooder. To produce eggs in cold weather is also impracticable without hot foods and drink. A constant supply of hot water for the laying flock and a comfortable brooding room where early chicks find refuge and warmth can be quickly made at slight cost. In fact, the only outside expense necessary is for the tank, and for a tight packing box to set over it. The tank is six inches deep and eighteen inches square. It is made of galvanized iron or zinc, and is covered over except two inches at one side. Mounted on blocks, or set over a little pit in the ground



INEXPENSIVE BROODER AND FOUNTAIN.

loosely enough to permit ventilation for a lamp placed below it, the water will be kept abundantly hot by a small flame, in cold weather. The brooder box has two-thirds of one end removed,—the end toward the little yard covered with inch wire net,—and a hole eight inches square cut in the floor. It is then placed on the tank of water and pushed back far enough to leave exposed the open space in the tank for the hens to drink at, as shown in the illustration. This is so narrow that the birds cannot befoul the water, and it seldom requires cleaning. Fine, dry sand is placed in the brooder, filling the place cut in the floor and an inch or two deep elsewhere. The portion of this sand coming in contact with the warm metal of the tank, conducts heat to the entire department, which is always an inviting retreat for the motherless little chicks. Half an hour after the lamp is lighted the hand must be placed on the sand, and if it is more than warm the flame must be lowered. Too much heat is injurious. The chicks themselves generate nearly enough in mild weather after they are two weeks old. A large lamp is not desirable for two reasons: First, it consumes too much oil; second, and of greater importance, it keeps the brooder too hot unless turned low, when it smokes, which is deleterious to the thrift of both hens and chicks. A small lamp will burn without smoke and give all the heat required. Three thicknesses of woolen cloth, cut in narrow strips, are hung before the open doorway of the brooder, excluding light and keeping in the heat. A broad board nailed to the top of the brooder over the drinking fountain will prevent hens from roosting over it if it stands in the hennery. To have it project through an aperture cut in the siding for the purpose, is more desirable, keeping the chicks and their foster parent in a separate room. The covering of the tank in the manner indicated and as shown in the illustration is essential, to prevent contact of the chicks with steam and moisture..

IMPROVED MILK-SETTING TABLE.

Those who do not use a creamery for cooling milk and raising cream should use every practical effort to cool the milk as soon as possible after being strained, and one of the greatest requisites is a cool cellar. The next important thing is to so locate the pans that there is a free circulation of air all about and beneath them. The accompanying illustration shows a milk table which was planned by L. D. Snook for this purpose. It is so simple and cheap that any farmer can make one. For the size of a table needed for five or six

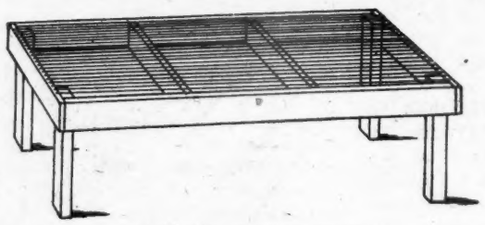
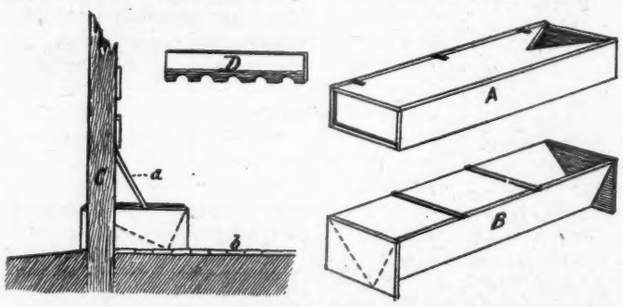


TABLE FOR COOLING MILK.

cows, cut four legs or supports, two and one-half feet in length, from three by four-inch hard wood stuff, and firmly nail to the side of one end of these a board at least eight inches wide, to form the sides of the table. Along the top edge of each end drive wire fence staples, one and one-half inches apart, with about a quarter of an inch of staple left projecting. Through these staples tightly string No. 12 galvanized wire lengthwise of the table, as shown, making all splices near the staples, to produce a smooth surface in the center. For every four feet in length, nail a cross-piece or support. The proper width is for three rows of pans, and by a little calculation the cross-pieces can be located between the cross rows of pans. Hence no wood work will be within several inches of them. Should the space be limited, a two-story table may be used by increasing the length of the legs and using a four-inch board for the upper sides, in which case only two rows of pans will prove more convenient to place in position and remove, unless the space between the two tables be increased, which is easily done. By using the best galvanized staples and wire, these tables will last many years, and in most sections wire can be obtained almost as cheaply as the pine boards. Milk thus set cools as quickly as if hung in mid-air.

CONVENIENT PIG TROUGHS.

When a pig comes to a trough for feed or slop he generally comes in a hurry, and is not content with plunging his snout into it, but must thrust his forefeet into it also. If these are covered with mud and filth, as very often they are, this is mixed with the feed or slop, and certainly cannot be very conducive to the health of the animal. It would be much better for the pig, and the eater thereof, if this should be prevented, and the animal compelled to keep his dirty feet out of his dish. It should be borne in mind that



DEVICES FOR KEEPING FEED TROUGHS CLEAN.

the pig's neck is short, and that he cannot reach very far, and, therefore, his trough must neither be high, wide, nor deep, and it should be so placed that the bottom is on a level with his feet. Some good forms of troughs are shown in the illustrations from sketches by Fred Grundy, of Illinois. A watering trough is best made in the form shown at *A*. It should not be placed inside the yard, as is usually done, but it should be on the outside, with only about a foot of one end inside. The part outside should be fitted with a cover, to keep out trash, and also to keep the water cool.

The end inside the pen should have an aperture in the cover shaped as shown at *A*. An opening like this will permit the pig to get his snout in, but will prevent him from getting his feet in, and the trough will remain clean for a week or two at a time. For a feed or slop trough many good breeders prefer the shape shown at *B* and *C*. It is made from four to six inches deep, twelve to sixteen inches wide, and has several cross bars on the top to prevent the pigs from spreading it. It is also protected by a one and one-half inch board, notched as shown at *D*. This notched edge is covered with sheet iron or tin, to prevent the pigs from destroying it. An end view of this trough at *C*, showing how it is placed under the fence, with protecting board, *a*, and platform, *b*. As will be seen, all feed or slops placed in this trough is thrown forward, or toward the front, where the pigs can get it without having to get into the trough, while the long incline at the back allows plenty of opening for the slops or feed to be poured in. All pig troughs should be set on a platform of planks extending, at least, six feet in front of them. This will prevent the pigs from gouging a hollow therein, and the formation of a nasty puddle close to the trough.

A PROFITABLE THREE-ACRE FARM.

J. M. H. FREDERICK, OHIO.

A notable illustration of what may be accomplished at a comparatively small cost from a small acreage is presented in the very successful experiment performed by Mr. J. B. Borst, of Greentown, O., the owner and manager of what is claimed to be the largest celery farm under a single control in the United States. His home, however, is on what he is pleased to call his "Three-Acre Farm." From these three acres, he modestly says, he believes he secures quite as good returns as do some farmers from ten times the acreage, and that, too, with an expenditure of labor which amounts to little more than that required by ordinary morning and evening chores. One of the three acres is occupied by the home, the outbuildings, poultry yard, vegetable and fruit garden. From the remaining two acres three Jerseys are fed from the time the clover is large enough to be cut in May until vegetation stops growing in the fall; and at times a considerable surplus is fed to the horses and hogs. Every fall one plot of two-thirds of an acre is seeded to wheat. This supplies a family of four with bread during the year. In the spring the remaining two plots of the two-acre tract—each two-thirds of an acre—are in clover, one giving its first year's crop, and the other its second. The latter is cut first, and from it the cows are daily supplied with fresh, green food. When this plot has been gone over once, and the cutting of the second plot has commenced, the mowed patch is covered well with a compost of muck from the celery farm and with stable manure, and at once plowed. This is not later than the middle of June, and the plot is sowed to corn. By the time the second red clover patch has been cut the first time, the new crop at the side first mowed is again ready.

VIEW OF J. B. BORST'S THREE-ACRE FARM.

The last of August the corn is right for feeding. From this, three horses and the hogs, as well as the cows, are fed until the ground is again cleared, about the middle of September. After giving it a dressing of the compost, winter wheat is planted. In the spring the wheat plot is seeded to clover, and by the time the sowed corn has all been fed the young clover has attained a strong growth. Besides providing food, which is greatly relished by the stock, the fall cutting of the young clover frees the ground from the wheat stubble, which, if left until the following season, would be moldy, and, therefore, injurious to the feeding qualities of the clover. By his plan of soiling, Mr. Borst claims, a superior quality of butter is made. The clean clover and pure water cause a longer, more abundant and more wholesome flow of milk than is possible with cows which are given the run of large pastures, pestered by flies in summer, grazing close for grass which has been tramped under foot, and quenching their thirst at slimy, pools of stagnant water.

On the acre of land on which the house and other buildings are located there are fruits of many varieties, an abundant garden, and a poultry yard in which nearly one hundred chickens and more than a dozen ducks run—and all this without marring the beauty of the home, for the smoothly mowed lawn about the comfortable farm-house is dotted with well kept ornamental shrubs, and roses and other flowers in profusion. From the dairy, the poultry, the garden and the orchard, says Mr. Borst, the family of four is provided with all the necessaries of living, save the single one of wearing apparel; and quite often there is a very considerable surplus.

THE NEW JERSEY LIMA BEAN INDUSTRY.

A. S. FULLER.

The northeastern county of the State of New Jersey extends along the west bank of the Hudson river north of the city of New York, and is known by the good old Dutch name of Bergen. It is entitled to a goodly share of the glory of colonial history; but this is nothing to the present generation of its inhabitants, in comparison with the value of its annual crop of Lima beans. Any one who has ever had occasion to travel northward from Hoboken or Weehawken, up through the valley of the Hackensack or Saddle rivers, or over any of the numerous cross roads, must have noticed the immense number of beanpoles either lying in great heaps in the fields and elsewhere, or set up thickly over a few or many acres throughout this entire region of country. How or when this kind of pole bean became so popular in Bergen county it might now be difficult to determine, but it seems to have become a fixture here, and a bristling feature, especially in summer, when tens of thousands of poles are set up in position, all pointing to the source of sunshine and showers, both of which, and neither in excess, are absolutely necessary, else the farmers' labors are all in vain.

The cultivation of the Lima bean in New Jersey is a kind of circumscribed domestic industry, no one attempting to plant a larger acreage than can be attended to by members of the family, with, perhaps, a little outside aid at the time of gathering the crop; consequently, the larger proportion of the beans sent to market are raised by Germans, Hollanders, with a few French and Polanders, with large families, every member of which, from the age of four or five years and upward, work in the field to the full amount of their strength and ability. The owners of large farms will usually rent land at a reasonable price to their poorer, and often more industrious neighbors, or, perhaps, sell a few acres on time to the same; then comes the struggle to meet payments for rent, interest or principal, but all are usually forthcoming in proper time and required amount. Leaving out the cost of labor expended upon care and cultivation, the Lima bean is a very profitable crop, and this is why the industrious foreigner and his family take to it, and rarely fail to count up a goodly sum as the total earnings.

During the winter months the father and boys find some owner of woodland who will allow them to cut poles from the underbrush or small trees which need thinning out, and this, in most instances, without charge, although the owner of the woods may insist upon a share of the poles cut as compensation; but this would be an

exception to the general rule, because there is an immense area of first and second, and even third and fourth growths of timber in this region. The poles, when cut down, are hauled home in the rough, and the trimming, sharpening of the lower end, and reducing to the proper length, is all done in winter, the chips and other refuse pieces adding considerable material to the supply of summer fuel. The duration of these poles depends entirely upon the kind of wood of which they are made; white birch will seldom last more than one season, while those made of white oak, chestnut, and red cedar, may remain sound from five to ten years, if the poles are pulled up as soon as the crop is gathered in autumn.

The land selected for Limas is generally light and sandy, with a loamy subsoil, and when it is not moderately rich it is made so by liberal application of stable manure, for the cultivators of this bean have little faith in commercial fertilizers, although a little is sometimes applied to the hill to give the plants a push early in the season. Stable manure, however, is somewhat expensive, the greater part of that used coming from New York city by railroad, or sloops plying on the Hackensack river, and is left at the various stations and docks, where dealers sell it to farmers at a certain price per ton, wet or dry, but generally very wet, or about half water. This manure is usually spread broadcast and immediately turned under, whether applied in the fall or spring. If the grower does not have enough, or thinks he cannot afford to apply the manure broadcast, he applies it to the hill, mixing it in with a hoe after the poles are set in the spring. But as beans do not appear to deteriorate when raised in the same ground for a succession of seasons, it is best to apply manure in liberal quantities with the first crop, adding a little more annually as it may be needed.

As soon as the ground is plowed in spring and harrowed level and smooth, the marker is put on and the rows are laid out as straight as possible, at right angles, in order to admit of cultivating both ways with horse and a light cultivator. The rows should be about four feet apart, and where the lines cross the poles are set and hills made. At this distance it will take 2,722 poles for one acre, but the Lima bean grower rarely refers to acres, but the number of poles set, whether it be one or ten thousand. The setting of the poles follows the marking out of the rows, although the planting may be deferred for a week or two, or until the weather is favorable for the growth of seed and plants. In setting the poles, one or more men lead, making the holes about eighteen inches in depth with an iron bar; others follow, placing a pole in each, and then firming the soil about the base with the foot, to insure its remaining in position when loaded with vines in summer.

About the first week in May, or a little earlier or later, according to the variations of the seasons, the planting begins, and this is always done with the thumb and finger; four to six beans are thrust into the ground to the depth of an inch around the pole, the eye or *hilum* of the seed downward, for it is claimed, and experience has proved it true, that the plants will appear from three to four days sooner if the seeds are stuck in the ground in this manner than if thrown down on the side and covered with soil, as practiced with the ordinary round field beans. This hand planting of from 12,000 to 15,000 seed beans per acre is backaching work, but it is the practice, and the only way thought of in Bergen county. Under favorable conditions, the plants will begin to appear within five or six days; then come the cutworms, and they seem to know just where to find the young and succulent stems upon which they gorge themselves during the night. Sometimes these pests are so numerous that a dozen may be found clustered around the plants of a single hill, and unless soon caught and killed they will make a clean sweep of all, and replanting becomes necessary. At the first appearance of cutworms among the plants early morning visits to the bean field are in order, and the stronger the force and the more active the workers the better, for in this case, as in many others, "'Tis the early bird that catches the worm," and these early raids must be kept up for weeks, or until the prowling cutworm ceases its depredations. The cultivator and hoe must also be kept going, for weeds will start and grow as well as beans, and even if there were no weeds, frequent stirring of the soil is considered a very important operation, which is not to be omitted up to the time the plants come into bloom. But as soon as the young vines begin "to run," or have made shoots a foot or two in length, tying up and guiding the runners around the poles, "in the way they should go," must be attended to, and this repeated every week until the poles are covered to the very top. Bass-bark, twine, yarn, and even wet rye and oat straw, are all used for the cheap and pliable tying material. If all has gone well, picking may begin the first week in August, the lower pods filling in advance of those above, and as the first beans in the market always bring the highest price, there is always a little good natured rivalry in a neighborhood to see who shall send away the first few bags of Limas; after which picking becomes a kind of settled occupation, to be neither shirked nor neglected, until the frosts kill the vines in the fall. The Lima bean, as everybody is supposed to know, is used as a shelled bean, but while it is in an immature state, hence the pods must be picked when well filled, but before showing indications of ripening. They are usually sent to market in bags, each supposed to contain one bushel and a half. At the opening of the season the price may range from three dollars and a half to four dollars per bag, then gradually falling off, sometimes touching close on to one dollar per bag, but at this price few would be sent to market, until scarcity caused an advance. In some country villages and large manufacturing centers, like the city of Paterson, N. J., consumers demand shelled Limas, which are sold by the quart, this calling for extra labor on the part of the grower and his family, but the extra price obtained for the shelled beans pays well for the cost of shelling.

One hundred bags of pods is considered a fair yield per thousand poles, but it is sometimes more, and often less, especially in a very dry season; but if the crop is short, prices rule higher thereby, equalizing returns, taking one year with another. The bulk of the crop is sent to New York city by rail, although many of the growers take in loads with their own teams; but all are consigned to the commission men, who distribute to customers in the city and its suburbs. After the crop is gathered, then comes the stripping of the dead vines from the poles, pulling up the latter and hauling away and storing in heaps or under sheds until the following year, when they are again wanted for use, all of which calls for an immense amount of labor, but probably no more, in proportion to the returns, than in other lines of market gardening or farming.

HOP CULTURE IN WILLAMETTE VALLEY.

W. G. WHITE, OREGON.

Not many years ago, the Pacific coast farmer began to realize that wheat was not the most profitable crop which he could raise. California taught the Oregon farmer the value of fruit, while Washington, on the north, developed the hop industry as well adapted to Oregon as fruit. In these two industries lie the future of the Willamette valley. The hills are fast being covered with magnificent orchards of prunes, apples and pears, while the fertile river bottoms bristle with hopyards. The hop plant is hardy, easily cultivated, not subject to climatic changes, well adapted to Oregon soil, and the average yield per acre will compare favorably with any portion of the world.

The soil most sought after is the river bottoms, which are sandy. Here the yield will average two thousand pounds per acre. In the sandy loam, the root fibers of the hop can reach out and absorb the moisture. The more compact or elevated the ground the less the yield, but the better the quality of hops. The upland yards will give a yield varying from one thousand to fourteen hundred pounds per acre, while the low grounds will yield from fifteen hundred to twenty-two hundred pounds. Small yards of ten acres are making independent livings for their owners. That the people are fully aware of this is seen by the thousands of acres already in cultivation, and the preparation to extend the yards.

Placing the yield of hops, per acre, at fifteen hundred pounds, the grower can contract the entire output of his yard at ten cents per pound, for a term of years; estimating all expense of raising and placing hops in the bale at eight cents, there is a handsome net profit of seven cents per pound, or $105 per acre, which from my experience is an extremely careful estimate. Of late years, the hop has been subject to attacks from lice, which at one time threatened to destroy the industry, but the timely aid of the sprayer has exterminated the lice, which are now only found in neglected yards. In order to get a good crop, careful cultivation is necessary. Some growers cultivate as often as ten times in a season, before the vines close the passages between the rows. One man can attend to ten acres.

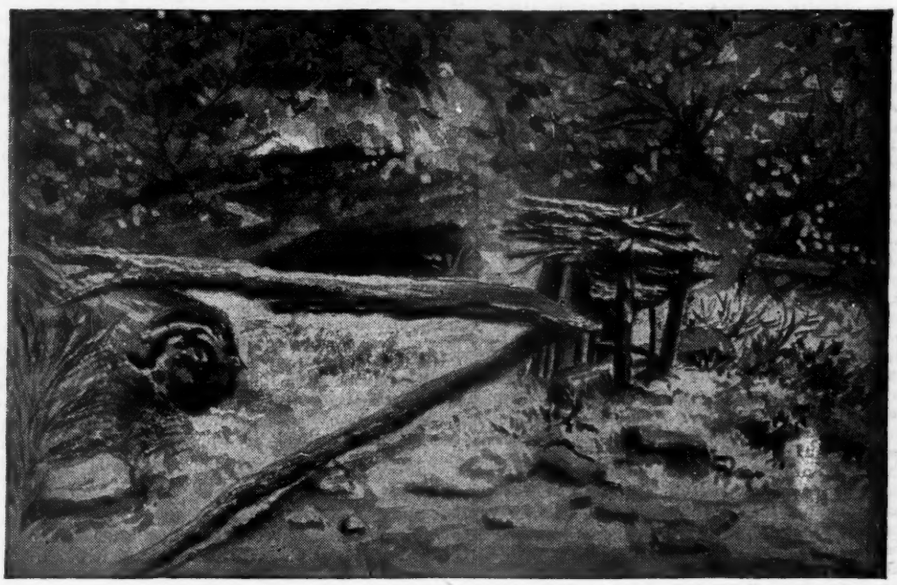
Picking is the gala time of the season. In the yards will be found every man, woman and child who can possibly find a place, singing, laughing, cracking jokes, and working away as though life depended upon the number of boxes a day. The general average wages paid to pickers is about $1.50 per day, the yards paying fifty cents for a nine-bushel box of carefully picked hops. Many of the girls who earn their living out in service, make as high as $3 a day, or spending money enough to clothe them for the year.

HOW TO MAKE A DEADFALL.

W. Z. HUTCHINSON, MICHIGAN.

It takes longer to build a deadfall than it does to set a steel trap, the fox is too wary to enter it, and the muskrat's home is in the water instead of on the land, where the deadfall must be built. Aside from these objections, the deadfall is the equal of the steel trap; in one respect it is the superior of the steel trap, as it will catch and kill a skunk without affording him an opportunity to use his peculiar perfume. The method of construction is shown in the accompanying illustrations, which are from photographs of actual traps. A deadfall consists of a pole eight or ten feet long, called the fall, with the split end resting on the ground and a stake driven through it into the ground, to prevent the fall from rolling, and the other end propped above another short piece of pole, perhaps two feet long, called the bed-piece (Fig. 1). These poles are held in place by two pairs of stakes, a foot and a half in length, the distance between the pairs of stakes being six or eight inches. It will be seen that if the fall should be raised six or seven inches above the bed-piece, and held in this position until some small animal crawled under it between the pairs of stakes, and then the fall should be suddenly dropped, the animal would be caught between the fall and the bed-piece, and be killed. If the fall is not heavy enough without it, the end of a chunk of wood is laid upon it. To hold up the fall, a little stick about six inches long is used. This stick is called the bearer, and is placed in an upright position at one side of the opening between the pairs of stakes, the fall resting upon its upper end, and the lower end of the bearer resting upon another little stick, called the spindle. This spindle is about ten inches in length, and rests crosswise upon the bed-piece, its inner end projecting back into the trap about seven inches, and its front end projecting about an inch in front of the bed-piece. It is upon the outer end of the spindle, just outside the bed-piece, that the lower end of the bearer rests. It will be seen that so long as the back end of the spindle is held down, the fall will remain up; but the moment the back end of the spindle is released, it will fly up, throwing the bearer out of position and letting the fall come down. To hold down the back end of the spindle, a small stick is driven into the ground about two inches from the end and to the right of the spindle as the observer faces the trap. On the side of this stick next to the spindle, and on a level with it, is cut a small, square notch, and into this notch is slipped the edge of the spindle. The bait is placed on the extreme inner end of the spindle. So long as the spindle is in the notch, the trap will remain set, but when some animal crawls into the trap and pulls on the bait, the spindle slips out of the notch, flies up, and the trap is sprung, catching the unfortunate intruder and pinning him to the ground. To compel the animal to pass under the fall, a pen of stakes is built around the back part where the bait is placed (Fig. 2). It was this part that I made too large in my earlier efforts at trap-building. This pen should be no longer nor larger than is necessary to allow one-half of the animal's body to pass inside the trap. Such a deadfall as described will answer for catching minks, muskrats, raccoons, and skunks. Of course these animals vary in size, but the large ones will be caught nearer the head; that is all the difference there will be. I always used bait that would attract all of these animals, and thus there was a chance of catching whichever came along. The top of the trap is also covered with bark; and it is well to lay some chunks of wood on the bark, as I have known raccoons—evidently not without suspicion and cunning—to poke off the cover if not weighted, and enter the trap unharmed by way of the top. The depredations of various small animals are often of serious consequence to the farmer, especially when the barnyard is near a stream or a woodland covered with undergrowth. For such situations the deadfall described above will prove very useful. The boys can have much sport during their leisure hours, and perhaps a little profit, also, in freeing the farm from the enemies of the poultry.

FIG. 1. DEADFALL IN PROCESS OF CONSTRUCTION.



F.G. 2. A DEADFALL TRAP COMPLETED.

Ventilate the Cellar.—There will always be a great amount of moisture given off from a cellar full of vegetables. Unless some means are provided for the escape of this moisture, it will saturate the floors above, and foul gases will permeate the house, and sickness may be the result. Always have a pipe or flue which will enable the moisture and gases given off from decaying vegetable matter to pass off through it. Do not neglect this. It not only prevents sickness, in many instances, but it helps to keep the vegetables in a much better condition than you could expect to keep them in a close cellar which lacks a ventilating foul-air pipe.

Memorable Christmas Days.

ALICE CHITTENDEN.

Ever since that first Christmas day when the Babe of Bethlehem opened his eyes on the world he came to redeem, many notable Christmas day events have been recorded. It is sad indeed that most of these tell of bloodshed and human wickedness run riot. Doubtless history has spared us many a recital of like tales, but if any pessimist who thinks the world is growing worse will spend a few moments in retrospection, he may find that this Christmas day of 1893 is the brightest that has yet dawned on the world.

Looking back sixteen centuries we read of a little church in Nicomedia that was filled with worshippers on this day. Dioclesian, the emperor, gave orders to have the doors closed and the building fired and not a single Christian escaped. The coronation of William the Norman in the eleventh century took place on Christmas day, and was the occasion of a dreadful massacre. Outside Westminster Abbey were placed soldiers to repress any hostile demonstration, and when the people within, both Normans and Saxons, were asked if they would have William for their king, the acclamations of the Normans was so loud that the soldiers, believing the tumult was caused by an attack on the Normans, at once set upon the unoffending people of Westminster, killed many and burned and plundered many homes before they could be stopped. Two years after, on this day, William marched in person against some powerful Northern barons who had revolted. He directed a universal slaughter, and many thousand innocent men, women and children were butchered, and not a building in the territory was left standing, or even a beast left alive. It was on Christmas Day, 1170, that Thomas a Becket preached his own funeral sermon in his Cathedral church at Canterbury, for it was the words of reproach and indignation in which he spoke of the treatment the English were receiving at the hands of their conquerors that caused his death. The most notable Christmas day that England has ever known was that of the year 1214, on which an assemblage of knights, prelates and a primate, forced King John to sign the great charter of English liberties. On December 25, 1264, hinged the prosperity and perpetuity of the English nation, for it was then that the people were called upon to decide how they would be governed, and that their representatives went to London to determine what should, and what should not, be law. In 1280, Lord Cobham, Sir John Oldcastle, was hung in chains over a slow fire and burned for heresy and treason. In 1384, on this day Wickliffe died as he was about to preach his Christmas sermon. In 1520 Martin Luther celebrated his Christmas by burning in the market place at Wittenberg the Papal bull which authorized the sale of pardons for sins not only committed, but to be committed. In the year 1163 the great plague had stricken the city of London, and on Christmas day the people died at the rate of a thousand in twenty-four hours.

Many painful things have happened on past Christmas days, and possibly there may be dreadful happenings in the future, but who shall say that the world is not growing wiser and better, that men do not love their fellow men more, that the brotherhood of man is not better understood than formerly? Never have there been so many Christmas feasts spread for missions and newsboys' homes; never have there been so many public and private enterprises for the benefit of the needy; never before has the elevation of mankind been carried on so grand a scale.

Clear Starching Shirts.

A subscriber asks what to put in to give a gloss to shirts, and how the starching and ironing is done. The gloss given in some laundries cannot be imparted at home unless one has learned the trade, nor is it desirable that it should be given. Most gentlemen prefer the medium gloss of home work. To one ounce of the best starch add just enough soft cold water to make it into a thick paste, which must be rubbed smooth and free from all lumps. Stir in a scant pint of boiling water, squeeze in a few drops of blue and let it boil half an hour in a double boiler to prevent scorching and obviate the necessity of more than an occasional stir. Keep it covered while on the fire to prevent accumulation of dust, and when off the fire so that a scum does not rise upon it. While boiling add also a piece of spermaceti the size of a nutmeg and half a teaspoonful of salt; this will give the desired gloss and prevent sticking. Dip and wring out the pieces as soon as you can bear your hands in the starch. Clap well, hang out to dry and when ready to iron dampen by wetting the bosom, collar and cuffs (if these latter are attached) in a thin raw starch made by dissolving a scant tablespoonful of starch in a pint of lukewarm water. Sprinkle the rest of the garment and roll up tightly. After an hour you may begin by ironing first the back, then the sleeves, then the collar and bosom, and then the front of the shirt. Before you begin with the collar and bosom, rub them well with a soft white cloth wrung out of soft water. The irons must be of the cleanest, and a polishing iron must be used for bosom, collar and cuffs. Cream white is the best color.

A Novel Christmas Cake.

S. JENNIE SMITH.

"Marion, can you conceive a new and strange idea for Christmas evening?" inquired Grandma Crosby, turning with anxious eyes to her eldest daughter; "we want something that will both please and surprise the children. I'm aware that we always impose on you, but are you equal to another invention?"

"I am willing to try," was all the answer given, but Grandma Crosby felt satisfied; she knew that when Daughter Marion promised to try she always accomplished considerable. Therefore, the management of the Christmas evening celebration was left entirely to her.

I was one of the many guests that had come to spend Christmas at the old Crosby mansion and, as I had arrived a day or two before that time, I chanced to overhear the above remarks. Consequently, I was very curious in regard to the surprise in store for Grandma Crosby's numerous grandchildren.

But, when the important evening arrived, I failed to notice anything out of the common. During the day I had helped entertain the little ones, in order to give their Aunt Marion a chance to make her preparations without interference from them. Yet, when we all gathered in the front parlor to listen to the songs, recitations and plays that the children had learned for the entertainment of their elders, we saw before us, in the large back room, nothing but the platform that was always erected there for such an occasion. To be sure, some of the corners were curtained off for the benefit of the performers, and a few flags adorned the stage, but there was not even a Christmas tree anywhere visible.

At the close of the program Uncle John came forward and announced that he failed to see any Christmas presents. "But if the audience will excuse that omission," he added, "we will try to supply everybody with cake." So saying, he drew aside one of the curtains, and brought to our view the largest cake that ever appeared at a celebration of any kind. The top of it was fully four feet in diameter, and, though it rested on a table, we discovered that it was decorated as prettily as the cakes that grace our modern wedding feasts.

"I suppose we might as well cut it," Uncle John observed, and, with a large carving knife in hand, he mounted on a bench and proceeded to cut into the big cake. No sooner had the knife entered the top than there was heard the most terrific screams, which seemed to come from inside the cake. Uncle John drew back and said, "Why, it appears to be alive, but we must eat it;" and, amid the applause of the audience and the shouts of the children, he began to cut again, when, suddenly, like Jack-in-the-box, a figure sprang up, breaking right through the top of the cake. It was no more nor less than dear old Santa Claus, looking as jolly and as ludicrous as ever.

"Why, Santa," cried Uncle John, "what are you doing here?"

"I was determined to come," answered the good fellow, "and I thought the surest way was to come in the cake."

"But where are our Christmas presents?" asked Aunt Marion. "There is not a gift lying around here anywhere."

"Well, you see, I could not get here last night, so I brought the presents and the refreshments in the cake." At the last word he leaned down and brought up a handsome watch for Grandpa Crosby. Then, after three rousing cheers had been given him, he continued to hand out packages as fast as Uncle John could hand them around. It was wonderful how much that cake contained. There was something for everybody present, as well as a bountiful supply of refreshments for us all, and, after we had each tasted the big cake, there seemed to be plenty of that left, too.

Toward the latter part of the evening I went behind the scenes to examine that wonderful cake. I discovered that the foundation was a very large iron hoop, which rested on the top of a big packing box. From this hoop were fastened long pieces of wire, bent about half way to form the sides, and meeting at the center to form the top. This frame, carefully covered and prettily decorated with white paper, gave it the appearance of a beautiful iced cake.

The front of the box was hidden by a table-cover, and part of the top had been taken out to allow Santa Claus to stand inside, and a portion of the back had also been removed, so he could receive the presents and refreshments from some one who stood behind the platform.

"But how did you make it appear as if you were cutting the big cake?" I asked.

"Merely by laying a real cake on top, in such a position that it could not be seen by the company, and carefully cutting it there."

The whole idea was so novel that I begged permission to give it to the readers of the AMERICAN AGRICULTURIST. My request was granted, and now anybody who chooses may copy Aunt Marion's Christmas cake.

Appropriate Christmas Gifts.

KATHRINE B. JOHNSON.

A great deal of fine sentiment, as well as time, are foolishly expended every year in trying to prove that Christmas gifts, which represent the giver's own hand work, possess an indescribable charm that no amount of loving thoughtfulness and self-denial can impart to those which are purchased readymade at the shops. What matters it, any way, whether such reasoning is true or fallacious? As long as the majority of women love to do fancy work, and are practical enough to know that a small amount of money will make a much more substantial showing when the gifts are made at home, such gifts will predominate. But do get out of the ruts and make something that will have the merit of novelty, as well as beauty. If possible, study your friends' taste and needs, that your gift may be appropriate, and in every way pleasing. We are frequently told that cost and kind mean nothing, but we know that the gift that fills a long-felt want is the one that is most welcome.

Because one is exceptionally skillful with the needle, or brush, does not necessitate her being vain enough to think such work must inevitably confer the greatest amount of pleasure upon her friends. Then, again, don't be too particular about giving useful Christmas presents. That is, don't use too much of what is generally supposed to be "common sense." The things one wants, but does not actually need, are, by no means, always extravagances. Ornamental accessories of the wardrobe and home are positively essential to the happiness of every woman of refinement, and handsome laces and ribbons, embroidered table cover, bit of jewelry, silver or glass ware, will confer a far greater and more lasting pleasure than woolen bed blankets, petticoats, or hose, unless one is positively in need of the necessities of life. In short, heart work goes without saying with either kind of gift; what is needed is more head work and less vanity.

The Kitchen Broom.

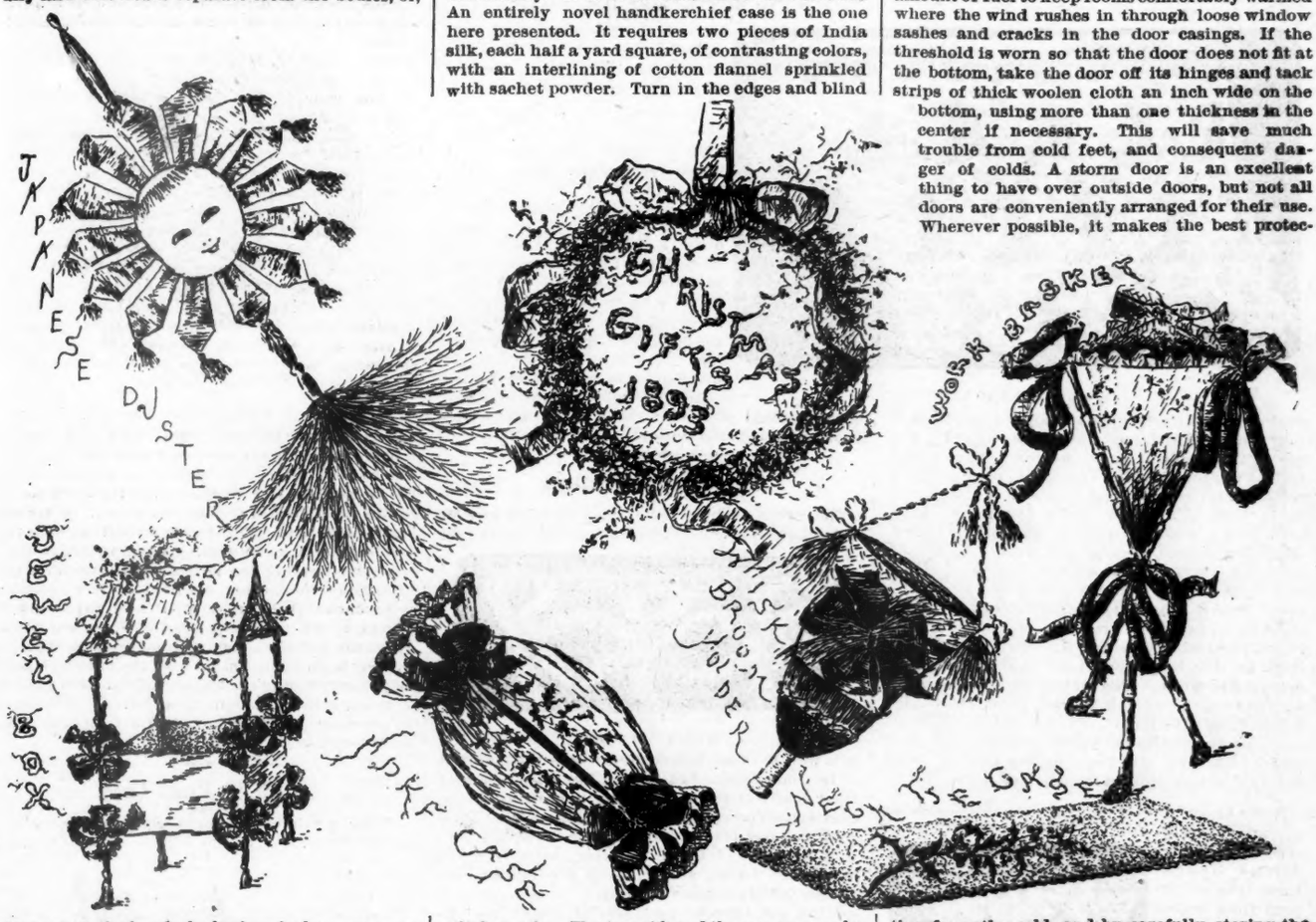
Having a string in the end of the broom handle wherewith to hang it up by, used to be one of the tests of a good housekeeper. There is a little device, however, that is better than the string,

which, as every one knows, is always wearing through just when one is too busy to put in a new one. Drive two nails in a convenient place to hang your broom and just far enough apart to admit the handle; then put in the broom upside-down with the shoulder resting on the nails. A broom that is washed occasionally in pearline, or washing soda suds, and dried quickly, will last longer than one that fails to receive this attention.

Inexpensive Christmas Gifts.

If any of our readers find themselves belated in the preparation of the tokens with which they love to greet their friends at Yule tide, we commend to them this list of Christmas gifts, all of which are easy of manufacture and inexpensive—two very desirable qualities.

Any housekeeper will like a Japanese feather bric-a-brac duster, and if you have been careful of the odds and ends of ribbon, you can make one for ten cents. At Japanese stores you can generally find doll heads separate from the bodies, or,



at any rate, the head of a broken body, or you can buy a small bisque head for five cents; the tiny duster will cost no more. Glue short strips of ribbon around the neck, sewing the ends in points and keeping them in position with bits of ribbon wire; sew a small tassel of embroidery silk to the end of each. Fasten the handle of the duster through a hole in the top of the head, which must be made neatly. Hang up by a loop of ribbon. A head ornamented as above might be hung up in a corner and used as a holder for a rather larger duster, the handle of which can be slipped in, feather side up. A brass ring sewn to one of the points of ribbon will serve to hang it up by.

Bits of bark and moss and twigs, and the merest scrap of velvet or plush, with a yard of five cent ribbon, will make for some fair cousin a receptacle for her jewelry that will also be an ornament to her toilet table. Fashion a little house of pasteboard, as shown in our illustration, the supports being rustic twigs; cover the pasteboard with pretty lichens and moss, using strong glue to fasten them on, and tie it together until dry, then remove the strings and tie on the ribbon bows. The little box must be lined with plush to make a soft bed for the rings and gewgaws which it is intended to hold. Small boxes, lined with plush and covered on the outside with lichens and moss, may be used for pin and hairpin trays. Very artistic wall pockets, scrap baskets and doll houses, can be made with well-dried moss glued on a pasteboard foundation.

The big brothers, cousins and lovers are just as fond of a pretty necktie case as young girls are of veil and handkerchief cases. It is best to make one of generous proportions, say 9x18 inches after it is folded, which will therefore require a piece of goods 18x36 inches. Linen, plush, silk or velvet may be used, but white linen that can be laundered is really charming and the most serviceable. The interlining of white cotton flannel and the lining of some bright colored India silk can be fastened in with few stitches and taken out when it is to be sent to the wash. On this lining tack diagonally two bands of ribbon to hold the ties in place. Sprinkle the interlining with sachet powder. A monogram, or a sprig of holly done in the natural colors with wash silk, makes a pretty device for embroidery. It is to be folded and not tied shut. An entirely novel handkerchief case is the one here presented. It requires two pieces of India silk, each half a yard square, of contrasting colors, with an interlining of cotton flannel sprinkled with sachet powder. Turn in the edges and blind stitch neatly. The two sides of the square may be embroidered with a running vine, or with the monogram and "Merrie Christmas," and are to be left for the opening. Three and a half inches from each end gather with a strong thread, and tie with a ribbon finished in a pretty bow. It is a very convenient case to carry in a trunk. A handsome one for a bride would be of white brocaded silk, lined with pale pink.

The always needed and too often lacking whisk broom can be kept in its place by a holder made of a butcher's cuff. It is to be ornamented with a bow of ribbon on the front with a frayed-out bit of manilla rope inserted. Hang up by rope sewed in loops with fringed ends at either side of the cuff and tied in a bow and ends at the top. These cuffs, by the way, can be made into hair receivers, knitting bags and flowerpot holders.

A young girl, not fond of sewing, might be incited to industry by one of the pretty work baskets shown on this page. Its foundation is three-cent bamboo canes wired together; a piece of strong wire is fastened at the top, and on this a bag of China silk is shirred, which may be lined with silesia, if desired for extra strength. Bows and loops of ribbon are tied at the corners and where the canes join. A foundation like the above, omitting the silk bag makes a good standard card receiver if a brass plaque be placed on top. A heavy and not brittle plate is best, as it can only rest on the top of the canes. A pretty Japanese wicker basket could, however, be used in its stead, and if one is a bit of an artist, could be decorated with autumn leaves or a spray of flowers in a very effective manner.

Hints for Cold Weather.

ELLA ROCKWOOD.

Now that cold weather is upon us look well to the windows and doors to see that no draughts of cold air can enter. It is all very well to have ventilation and plenty of it, and bedrooms in particular should have a daily airing, but the average house has enough opening of outside doors to furnish a good deal of fresh air, especially if there are children in the family. It takes an extra amount of fuel to keep rooms comfortably warmed where the wind rushes in through loose window sashes and cracks in the door casings. If the threshold is worn so that the door does not fit at the bottom, take the door off its hinges and tack strips of thick woolen cloth an inch wide on the bottom, using more than one thickness in the center if necessary. This will save much trouble from cold feet, and consequent danger of colds. A storm door is an excellent thing to have over outside doors, but not all doors are conveniently arranged for their use. Wherever possible, it makes the best protection from the cold, and by carefully storing the sections during the time they are not in use, one will last for years.

"An ounce of prevention" is nowhere better illustrated than in taking care of one's self to prevent taking a cold. Going out of a warm room without the precaution of putting on an extra garment, to hang up the clothes or to get an armful of wood, has often brought on a severe cold, which might have been easily prevented. Especially those persons with weak lungs, or those liable to throat trouble, should be very careful not to expose themselves to sudden changes of temperature. A chest protector of chamois skin or of paper worn next the flesh is a wise precaution and will often save a severe illness, as the cold cannot easily penetrate it.

A soapstone foot warmer, which may be bought for twenty-five cents, will be found to be a great source of comfort to any one troubled with cold feet or hands. In riding, the hands and feet may be kept warm for hours in the severest weather by the use of one, well heated, before starting out. Placed in the foot of the bed at night it insures warmth all night. Make a case to draw over it

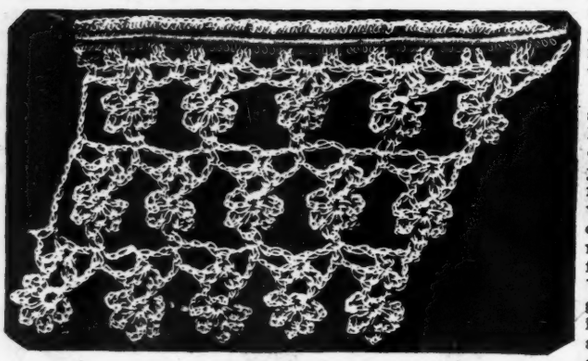
after it is warmed, leaving the wire handle out to lift it by. For many things this is superior to the hot-water bag, as there is no danger of its springing a leak, and it holds heat longer.

Laces for Baby Dresses.

E. M. LUCAS.

Now that lace is so much in vogue, crocheting is again in favor. Very pretty, flower-like laces, dainty enough for any mother's darling, may be crocheted from fine linen or cotton thread, using fine mignardise or feather edge braid as a foundation. A chain of crocheting may be substituted for the braid, but the braid makes a prettier finish with just the touch of daintiness so desirable.

FORGET-ME-NOT LACE.—First row—*one treble in first loop of braid, one treble in next loop, two chain, pass over four loops; repeat from * the length required. Second row—*One single crochet in two chain of previous row, two chain, two treble in next two chain; five chain, form into a loop by working a single loop in first chain; **four



FORGET-ME-NOT LACE.

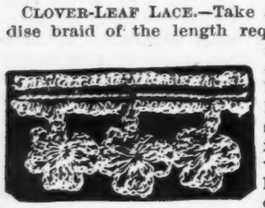
chain, one single crochet in loop, repeat from ** four times. This forms a tiny floweret, with five picots, two treble in same, two chain the previous trebles were worked in; two chain, pass over two trebles, and repeat from * to end of row, seven chain turn. Third row—Make five more chain, form into a picot by working single loop in first chain, two chain, *one single crochet in middle loop of floweret of previous row, two chain, picot, two chain; repeat from * to end of row, two chain, turn. Fourth row—*one single crochet in single crochet of previous row, two chain, miss two chain, two treble in picot; five chain, form into a loop, in this loop work four chain, one single crochet five times. This makes the floweret, as in second row. Two treble in same picot, two chain; repeat from * the length of row. This lace may be made of any desirable width by repeating third and fourth rows. On the opposite side of braid work one single crochet in each loop to the end.

TULIP-LEAF LACE.—First row—One single crochet in nine successive loops of mignardise braid; three chain, repeat from beginning of row to length required. Second row—One single crochet in center of nine

TULIP-LEAF LACE.

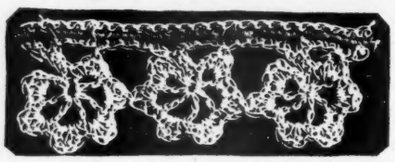
single crochet of previous row; five treble, five chain, five treble, all in three chain; repeat from beginning of row.

CLOVER-LEAF LACE.—Take a piece of mignardise braid of the length required. One single crochet in ten successive loops of braid, six chain, leave two chain for stem, and form last four into a ring by working a single loop in fourth chain, counting from the needle. In this ring is worked a tiny clover leaf in three sections, as follows: *Three chain, three treble, three chain, one single crochet; this forms one section; repeat from * twice more. Work three single crochet down the stem, and repeat from the beginning. The leaves must be joined at first and last sections. Work a row of single crochet on opposite side of braid.



CLOVER-LEAF LACE.

ROSE LACE.—Work one single crochet in every alternate loop of braid eight times, three chain for



ROSE LACE.

stem, three chain formed into a loop, *three chain, one treble worked in loop, repeat from * five times. Turn, and in each section work one single crochet, three treble and one single crochet; three single crochet down the stem, and repeat from beginning to length required. The sixth section of each rose is joined to the fourth single crochet of the group of eight worked on the braid. The fifth section is joined to its neighbor of the next rose. A row of single crochet are worked on opposite side of braid.

HYACINTH LACE. Work one single crochet in every alternate loop of braid nine times, four chain for a stem; three chain, join in a ring. Six chain turn, miss one, five single crochet worked on the chain, one single crochet in the ring. Work five more points in the same manner; four single crochet on the stem. Work four single crochet of the group of nine single crochet as in the beginning, join one point and work remaining five single crochet. The third and fourth points are joined to the first and second points of next rosette, as shown in the accompanying engraving.

Christmas Decorations.

The Sunday school rooms and churches as well as our houses require decoration at Christmas, and

HYACINTH LACE.

it is well to think beforehand where the material is to come from. Let the children use some of their spare time in gathering quantities of the prettiest lichens and mosses from fence rail and rock and tree-trunk. These will make pretty mottoes, texts and letters. Cut the letters from old cardboard boxes, and glue on the mosses and lichens shading them as prettily as possible, and adding immortelles and bits of bright berries. Gather the mosses as late in the autumn as possible, and keep in a cool, dark place. Many of the grasses, which abound in swampy places are pretty if dipped in water, lightly shaken and dredged with flour and hung up by the stems to dry. To bleach grasses, dissolve two tablespoonfuls of chlorinated lime in a quart of water, having moistened the lime first with water and mix it to a smooth paste; add a few drops of acetic acid and let it stand fifteen minutes, when the clear liquid must be poured off. Immerse the grasses in this and in fifteen or twenty minutes many of them will have bleached; others require a longer time and some will not get perfectly white, thus giving a pleasing variety. Rinse in cold water and hang in the sun to dry. The children will ask no better fun than to experiment with this, and the fact that their work will be used to beautify home and Sunday school and church at the happy Christmas time will add to their interest in it.

For a Paper Wedding.

Many persons feel a delicacy about celebrating the various sugar, tin, wooden, crystal, and other anniversaries of their wedding, because the giving of gifts has been carried to such an extent that it has become a burden. A paper wedding, however, can be celebrated without any uneasiness on this score, the gifts almost of a necessity being simple ones. At one of the prettiest of these weddings the bride and the guests wore dresses of crinkled tissue paper ornamented with paper flowers. The house and table were decorated with paper flowers only, and the plates, napkins and tablecloth were of paper. The gifts were well chosen, and it almost seemed as if the guests had planned them in concert, so free from repetition were they. Two charming tissue paper lamp shades, dozens of Japanese paper picnic napkins, books, a few simple etchings, a subscription or two to choice magazines, and a set of Japanese paper mixing bowls, were among them.

Homemade Upholstery.

A. S. WEBBER.

The accompanying sketches show an attempt to change the hotel and steamer look of this kind of rocker to a home look by means of simple embroid-

FIG. 1. EMBROIDERY PATTERN.

ery on the back and seat. The cushions are made a little smaller than the back and seat, and the embroidery is done on coarse dark gray flannel in old rose shades of rope linen; but the furnishings of the room should decide the colors. There are four shades used. The design is outlined with the lightest, and the plain thick darning is also done with that shade. The next darker is used for the crossed threads, which are held in place by being caught where they cross, with the lightest shade. The same shade is used to outline for a short distance the sprays that start from the cross stitches, and between them is filled with the darkest shades in simple running or seaming stitch. There can be much or little of the spray, as desired. [The detail of the embroidery is shown in Fig. 1, and the chair as ornamented in Fig. 2.]

Care of Fruit Cans.

There is so much negligence, especially when it is left to servants, in the care of fruit cans, that a

FIG. 2. ORNAMENTED ROCKING CHAIR.

word of warning may not be out of place. One should not wait until the canning season to sort, put together and clean cans and covers. As soon

as a can is opened, the fruit, whether it is to be all used, or not, should be emptied out and the can thoroughly washed with hot water and soda to sweeten it perfectly. Let it lie first on its side and then upside down until thoroughly dry. Meantime boil the cover in strong soda and water, and if this does not remove the white incrustations which sometimes form on the outside, soak it for a few days in vinegar and water. Let both can and cover be kept together and in a dry place. Throw away the old rubber rings. It is better and safer to buy new ones each year.

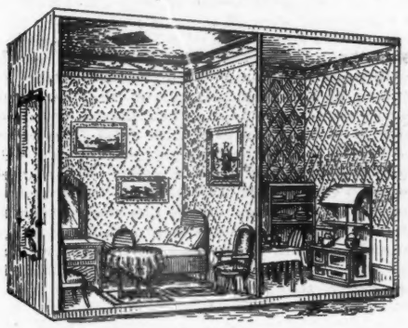
A Homemade Doll House.

MRS. E. R. WOOD.

Select a packing box of half-inch stuff, thirty-six inches long, eighteen inches deep, and twenty-four inches high when in position as a house. The front, of course, is left open. The outside may be painted, or it may be covered with any desired material. Paper the ceiling and walls inside with wall paper, using that with a small figure, as it looks better than large figures on so small a surface. Finish with a fancy border, and ornament the corners and center of the ceiling as you choose. A partition from front to back, twenty inches from one side, makes two rooms. The partition may be of heavy cardboard, or a part of the original cover of the box.

On the floor of the larger room, which is to be furnished as a sitting room and bedroom, tack a carpet of felt, flannel, or denim. A real window may be made at one side by cutting in an aperture and fastening a piece of glass over the outside, or an imitation window will serve, with curtains from a bit of old lace draped over it, and tied back with narrow ribbons. It will be an easy matter to make tiny pictures for the walls. They may be pasted on the walls and a frame of bright colored or gilt paper be arranged in the same way.

The room is now ready for the furniture. This



A CHARMING CHRISTMAS PRESENT.

may be bought at the toy store, or made at home by anyone at all handy with a pocket knife, out of cigar boxes, first soaking them in water to soften the wood, so that it will cut easily and not split. A center table, made of a circle cut from a cigar box cover, supported by three sticks, whittled out and glued to the top, can have a spread made of a square of dark red cashmere, slightly fringed at the edges. A flat cigar box, with spools glued to the corners for legs, forms a bed. A rounded head and foot board, cut from a cigar box can be also glued on. A tiny mattress to fit the bed should be made of ticking and filled with cotton batting. Fashion pillows in the same way. A blanket of heavy red flannel, buttonholed around the edges, and sheets, pillowslips, and a spread and shams of dotted mull, lined with red and edged with narrow lace, will complete the outfit. Toy chairs can be bought for ten cents apiece, and a bureau with a mirror on top for fifteen cents. Any other bits may be added by way of furnishing, such as scraps of cloth for rugs. A room of this size admits of considerable display, as will be seen in the accompanying illustration.

The other room is to be finished up as a kitchen and dining-room. A bit of small-figured table oil-cloth makes a pretty and suitable floor covering. A toy cooking stove is set in one corner, and a table of suitable size for the dollies to dine upon will not be hard to construct. Covered with a cloth and set with toy dishes and knives, forks and spoons of tin, it will not fail to please any little girl. Any other articles of kitchen furniture may be added. A small cigar box with the cover removed set up on end and fitted with shelves for the dishes could be easily made into a very good-looking cupboard.

Match Scratcher.

The carelessness of servants who strike matches on the nearest piece of furniture or on the wood-

work of a room will have no excuse if one places a number of these pretty match scratchers where they will be found most handy. Take a piece of water color paper five by six inches and outline on it with India ink, or paint in water colors, a rustic seat on which are seated two figures; over them glue an umbrella cut from sandpaper. Below letter in gold,

"A large umbrella, though in patches,
Is an excellent thing for striking matches."

The patches can be imitated by spots of paint.

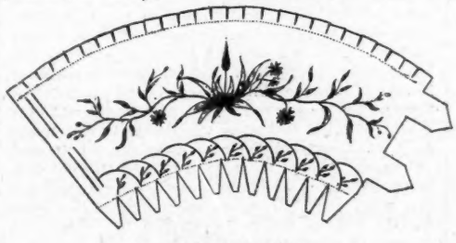
Flower Vases.

HELEN M. PRATT.

The prettiest vase for flowers is not one of china, silver or lava, however elaborate and beautiful in itself. Such vases are intended for ornament and are sufficiently decorative in themselves, without the addition of flowers. A clear glass vase is the only sort which gives the whole beauty of the bouquet. Through its transparent sides the pretty, interlacing supports, on which the flower heads depend are plainly seen joined to their respective blossoms, and the eye is satisfied, reassured in looking upon the combination. If you have not plenty of glass vases, small table or wine glasses are to be had for a few cents, and if they require a weight, a handful of pebbles from the garden may be dropped in the bottom, and will add to the general effect. Another advantage of the plain glass is that you may be able to tell at a glance whether fresh water is required for the bouquet, and the glass must be kept clear in order to be presentable.

Cover for Flowerpots.

An adjustable cover for a flowerpot made of heavy cartridge paper, after the design given here will be found very pretty and inexpensive.



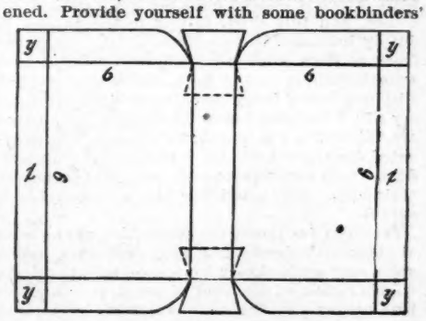
FLOWERPOT COVER.

It should be fitted snugly around the pot, the straps drawn through slits, and the points bent under to form the bottom. A little rim around the top is made by bending the little squares over as indicated by the dotted line. The color of the paper should harmonize with the plant it is to adorn, and the decoration on it may be as the taste suggests. A number of these covers that blend nicely form a very pleasing effect grouped together on a window seat, even if they are devoid of decoration.

How to Preserve Books.

While the books of the present day are so inexpensive that one may possess a library where a generation ago one could scarcely have afforded a dozen, they are also correspondingly slight in their make-up, and the student who is fond of his books will do well to take some means of preserving his well-thumbed volumes. Teach a boy to care for anyone of his possessions and he will place a proper value on it, while if he is allowed to neglect and ill treat a toy or a book it soon becomes of little worth in his eyes. Amateur bookbinding possesses a great fascination for one who attempts it with a desire to do careful work, and it is also one of the trades in which an amateur may be sure of success. Begin by learning to put stout paper covers on neatly. To cover a book six by nine and two inches thick, take a clean, smooth piece of manilla paper and measure off a piece twenty-six by twelve inches and trim and diagram as in the illustration, allowing three inches on sides and ends to fold over inside of the book cover. Next turn in the ends of the back piece, as shown in the dotted lines, the open book, face upward placed directly in the center, and the portions marked X folded over inside the covers. Then laying the book down and turning one cover back, fold the square corners marked Y in between the book cover and the paper and crease them down. If the covers are to remain on a drop of glue in the corners is permissible.

Print the title of the book and the author's name on the back. Small books require less turning in and large ones more. From putting on these covers to really rebinding a book is but a step. We will suppose that a book has not only lost its covers, but that it has become much loosened. Provide yourself with some bookbinders'



PAPER COVER FOR A BOOK.

glue and stout muslin. Put the book for a few days under the heaviest weight you can find; then take a strip of stout muslin and paste it over the back; when the glue has dried paste pieces of stiff cardboard or bits of an old pasteboard box to the first and last leaf of the book; you may even bind in two or the three blank pages if you desire, and when this again has dried, cover all with brown or tinted paper, or with silesia of any preferred color. The boy who inspired this article had a complete set of E. P. Roe's books, paper editions of which he had picked up at street stands for ten cents each, but which now were uniformly bound in stiff boards covered with dull blue muslin. So dextrously had this been done, that one would hardly have guessed at first sight that they were the work of an amateur.

An Old-Time Whatnot.

R. W. FLINT.

The corner whatnots so commonly in use a number of years ago, but now banished to the attic, make very useful corner cabinets.

Remove the legs from the bottom and tack canton flannel to the sides from top to bottom. A shade harmonizing with the other furnishings of the room should be chosen, but something dark is preferable as showing off to better advantage the articles placed before it. Fasten securely to one corner of the room about three feet from the floor. Fasten a rod of brass, or a heavy wire across the corner, even with the top, but of the same length

as the lower shelf, as the top shelf is usually narrower and the curtain should hang straight down from top to bottom.

Have the rod the exact length, and at the proper distance from the corner screw into the wall at each side a screw with a small hook on the end, into which the ends of the rod will drop, thus holding them in place. Hang a curtain of any suitable material, such as china silk or silkoline, upon the rod, dividing it in the center. When the shelves are filled with pretty bric-a-brac or dainty china it makes a very attractive corner.

Pretty Styles for Little Folks.

The black note so fashionable in costumes for adults, also appears in children's clothing, and a wee tot's gown of pink silk muslin, that could be developed equally well in pink or blue cashmere, hangs loose and full over a black silk guimpe and sleeves, while high up, under the arms, half-inch black velvet ribbon is carried around to the back and tied in a many looped bow. At one side, too, a cute little bag of the dress fabric is suspended, giving an old-fashioned and quite captivating appearance.

Cashmere is a very popular material for little folks' wear, as it comes in such charming tints, as well as white. A pretty, dressy affair is made with an extremely short waisted body, simply shaped by under-arm and shoulder seams, and closed invisibly at the center of the back. Over the lower part of the waist are then arranged a full front and full back, gathered at the bottom and shirred an inch or two below the top to form a standing frill. This leaves a square, yoke-like opening, above which is filled in with plaited silk of a darker shade than the cashmere. Full Empire puffs extend from the shoulders to the elbows, gathered top and bottom and arranged over coat-shaped sleeves, while the wrists are trimmed with two rows and rosettes of baby ribbon. Choux of the same ribbon likewise adorn the top of the skirt, which is shirred onto the lower edge of the bodice, and this skirt, falling to the ankles, is deeply hemmed, but untrimmed. An every-day frock of dark wool is stylish with a full, round waist buttoning in the back, and a skirt worked with one row of fancy stitching in black embroidery silk. The cuffs below the Empire puff sleeves are finished in the same manner, as are the graduated epaulette bretelles running over the shoulders, which have square ends, are quite smooth at their upper edges, and fall below in undulating curves.

The coats for these wee girlies, too, are as loose as their little frocks, generally depending from a yoke, and made dressy by a cape collar or deep, double ruffles at the head of the sleeves, and the hats are as cunning as themselves; bewitching little bonnets of silk, or silk and velvet combined, shirred on cords, puffed and frilled, or warm cashmere hoods edged with fur and with a diminutive animal's head perched on top, while each has a full white ruche set inside, round the rosy face.

Older lassies will require, at least, two school dresses, though a half-worn skirt can generally be made to do duty for one, if a cloth blouse be provided to wear with it. For unformed girls, the Norfolk waist, again in vogue, is an excellent model, and can be worn either under or outside of the waistband. The seamless back is laid in three box plaits, and these are the same in front, while the neck is finished by a rolling collar with flaring ends and the bishop sleeves by narrow cuffs. A belt ribbon confines it about the waist. For the new school frock, however, nothing will be found more serviceable than serge, tweed, homespun, or "hopsack," as our English cousins term it; and excellent colors are navy blue, brown, green, tan and fawn color. The skirt is circular, cut all in one piece, having a seam only down the middle of the back, this being the popular Empire skirt, so fashionable for old and young. To do this, open out the material to its full width, then fold it over sufficiently long to cut the skirt, making the fold the center of the front. It should then be lined throughout with sateen, and the goods slightly eased into the waistband in front, while the fullness at the back is gathered to the required size. For garniture, rows of either straight or serpentine braid are commended, encircling the skirt at the foot and the hips and running round the broad belt which ends in gathered fields at the back. The bodice is round and full, being drawn down in pleats in front, and the sleeves are small gigots, while bretelles, very narrow at the waist, but broadening over the shoulders, give the *cachet* of the season. A triple cape, each fall of which is edged with braid and the whole garment lined with silk and wool Austrian cloth, will prove a useful addition to this costume, which should be completed by one of the felt walking hats that come simply trimmed with a band of ribbon, and require no other ornamentation.

But my bonny school girl will want a Sunday frock, and this may be of pretty crépon, combined with black or colored silk. An artistic, girlish design has an Empire skirt, trimmed at the foot by a narrow ruffle of crépon above one of silk, while the upper frill is headed by a row of beading, through which ribbon is run, this being brought out at intervals and formed in rosettes. The body is of the surplice order, arranged in soft folds over a high-necked lining to show a deep V in front, and shirred in two rows at the waist line and on the shoulders. The opening is faced with crépon and overlaid with cross-rows of beading interlaced with ribbon. The standing collar matches, and four small rosettes are set, at intervals, from the throat to the point of the V. Short gathered caps top the Empire puffs of the sleeves, and the cuffs are also of interwoven beading. A crush belt of silk encircles the waist, closing on the left side with a frilled overlapping end. A velvet chapeau, moderately broad of brim, with a narrow Mother Hubbard crown and trimmed with loops of satin ribbon and standing quills makes a stylish best hat for a maid of twelve, while one of eight will be "pretty as a picture" in one of the chic three-cornered hats adorned with rosettes and short nodding ostrich tips, and with the becoming white lace ruche set inside.

December Dainties.

There are a number of little dishes that are very convenient to have in one's repertoire at holiday times when friends have a fashion of popping down upon one, and when it takes a full larder to answer the demands made upon one's heart and hospitality.

Devilled Fowls.—It is well to have plenty of fowls of various kinds hung and ready for cooking upon the slightest notice. For a hasty supper dish, after a cold ride, there is nothing much more appetizing than devilled chicken. They are to be singed, drawn, split down the back and trussed exactly as for boiling; flatten with a rolling pin; spread with a layer of made mustard; dust with bread crumbs and broil over a moderate fire. Every few minutes remove to a dish and baste with a little melted butter; season when about half done. They will require about half an hour to cook, and should have a little melted butter poured over them before sending to table. The rump and drumsticks of a cold roasted turkey makes an excellent dish. Score them three-quarters of an inch deep at half-inch distances and rub pepper, salt and cayenne over the incisions; broil for twenty minutes and pour over them a sauce made of three tablespoonfuls of gravy of any kind, one of lemon juice, and a teaspoonful each of mustard, mushroom catsup, Worcestershire sauce and Chili vinegar; heat this before pouring over the broiled turkey.

Chicken en Coquille.—This is delicious for lunch or supper, or may be served as a separate course at dinner. Prepare a nice young chicken as for boiling and put in a kettle with a quart of boiling water, a bay leaf, two cloves, half a small onion, a blade of mace, half a dozen peppercorns, and some parsley; cover and simmer until very tender; let it stand until cold in the liquor in which it was cooked. Then remove the white meat from the bones and cut into dice. Put one tablespoonful of butter in a saucepan, add a rounded spoonful of flour and mix over the fire until smooth; add half a pint of milk, cream, or the liquor in which the fowl was cooked and stir until the sauce boils and thickens. Season to taste, and add the chicken meat. Put this saucepan over boiling water, and stir until very hot, when the yolks of two eggs lightly beaten are to be stirred in. Serve on sippets of toast, or in little cases.

Creamed Oysters, properly cooked, are delightful. Cook together butter the size of an egg and two tablespoonfuls of flour; when smooth add a cup of hot milk and one of oyster liquor with a pinch of soda dissolved in the milk; stir until it thickens, add the juice of half a lemon, pepper and salt to taste, and a quart of drained oysters. Have ready an egg beaten light with some of the sauce, stir it in quickly, fill little scallop shells with the mixture, dust with crumbs, and brown in a quick oven.

Stewed Oysters, Baltimore style, will go straight to the heart of a hungry man. Take, as needed, three dozen large oysters, drain and place in a saucepan with one ounce of good butter; cover the pan and cook two minutes; season, add a gill of cream, a few drops of lemon juice, half an ounce of butter, and a little minced parsley. As soon as thoroughly hot, send to table.

Turkey a la Creole is a favorite Southern way of serving this bird. Joint as you would a chicken; dip in a batter made of equal parts of beaten egg and milk; roll in cracker dust, again in this batter, and lastly, in cracker dust and fry in equal parts of very hot butter and lard. The sauce for this is three ounces of butter, two of flour, heated together, and a pint of hot milk added slowly; season with salt, pepper and minced parsley. A nice way of serving potatoes with this is to cut them into small balls, boil, drain and pour melted butter over them, and sprinkle with salt and pepper and minced parsley.

A Plum Pudding is quickly made by crumbing a pound can of pudding made by a reliable firm, adding two cups of bread crumbs soaked in milk, a small cup of minced suet, three eggs beaten light, half a cup of sugar and a cup of stoned raisins. Turn all these ingredients, after mixing well, into a buttered mold and boil three hours.

Salted Peanuts.—A few quarts of peanuts shelled and salted are good to have on hand at Christmas. Allow a tablespoonful of butter for each quart of nuts and brown on shallow dishes in a good oven, watching carefully that they do not scorch. Shake fine salt over thickly, and throw them in a colander to cool.

Parker House Rolls.—The very nicest rolls are made as follows: Pour a pint of scalded milk over a tablespoonful each of butter and lard and a teaspoonful each of salt and sugar; when sufficiently cool add a cake of compressed yeast that has been dissolved in a half cup of lukewarm water and flour enough to make a thin batter. Do this at half-past eight in the morning and stand away until one o'clock; then knead in enough flour to make a soft dough. It must be as soft as can be handled; stand in a warm place until half-past four; roll out very thin, cut with a small, round cake cutter and fold over like a pocket-book, putting butter the size of a pea between the folds. Set in a warm place until half-past five, or until very light, and bake a delicate brown in a good oven. If made small enough this will give seventy of these appetizing rolls.

Don't Forget.

Grass stains on white fabrics can be removed by rubbing them well with molasses and spreading in the sun for an hour or two.

In purchasing canned goods, observe whether the head of the can is concave. A bulging appearance shows decomposition.

Rub white of egg over the bottom crust of pie-plant, berry or other pies, to prevent their becoming soggy and indigestible.

Unless the varnish has been taken off by heat, spots may be removed from furniture by rubbing vigorously with sweet oil and turpentine in equal parts. Afterwards wash with warm soapsuds and polish with crude petroleum oil.

Teapots should be washed and dried after each meal, and once a week have a strong solution of washing soda boiled in them, then rinse and dry well. Such management insures delicately flavored tea—if properly made.

An appetizing breakfast dish, and easier to make than fishballs, is a baked fish hash. Butter a biscuit tin, spread in it the hash, prepared as for balls. Brush the top with beaten egg, bake nearly one hour, and serve piping hot, in crisp, browned squares.

To clean a dirty kitchen sink, dissolve a piece of washing soda as large as an egg in half a pailful of hot water; with half of this give the iron a good scrubbing with a coarse brush, and wash out with a stout cloth and the remaining half of the water. Give a final rinsing with boiling water. Even when sinks are carefully kept they are better for this cleansing treatment at least once a week.

Bertha's Christmas.

IDA M. BRADY.

"I declare," said Mrs. Holland, "I don't know when I ever was in sech a heap. Here it is only two days before Christmas, and the great pile of bakin' I've got to do! And the children's tree to git ready and all! John's folks hev put me out awful, first sayin' they couldn't come, and jest the last minute changin' their minds. I wouldn't care if there was only more time to prepare for 'em, though of course I'm awful glad they're comin' s' fur's that goes."

"YES, YES, YOU MUST BE SANTY, JOHN."

She was rolling out pies in a little cleared space on the kitchen table. The rest of the table was piled up with unwashed dishes, as was also the sink. She was talking to her husband, who, in his "chore" overalls, was filing a tool in the warm corner back of the stove.

The filing ceased. "Wall, mother, 'tain't no use frettin'," he said, in his easy way. "Why don't Fanny help ye, stid o' screachin' away in the parlor?"

"Why, she's practicin' her carol that she's goin' to sing to the church, Christmas," answered Mrs. Holland, with asperity. "You ain't no call to say it's screachin', when Fanny's as pretty a little singer as you'll find hereabouts. And she's helpin' me lots, too, by takin' care of Elsie."

The filing and the baking went on a while longer; then, "Say, mother, why don't ye git Berthy to help ye out?"

The woman stopped, and the fretful expression disappeared. "Why," she said, gently, "I dunno but 'twould be a good idea. Go right over, father, an' see if she'll come."

Very carefully he put away his tools in his shed, and donning his great coat that hung behind the kitchen door, he started out across the snowy yard.

In a few minutes he returned. "She'll be right over," he said, cheerfully. "She seemed to be reel pleased at the chance. I guess they must be pritty poor off, her father bein' out of work so long. Mebbe they're poorer off'n we think."

"Well, I guess that ain't very bad, then," scornfully said Mrs. Holland. "I guess there wouldn't anybody be sufferin' much in Easton on account of hunger, with the church societies an' mission, an' everybody willin' to do."

"Pooh!" retorted her husband. "Some folks 'ud be too proud to let you know on't."

"Poor folks ain't gen'rally back'ard about tellin, of their trials. That's what *I've* found out," was Mrs. Holland's reply.

Nevertheless, her sharp eyes watched Bertha when she entered the room. The girl appeared just the same as ever. Her cheap print dress looked neat and clean, her pretty hair was braided down her back and tied with a blue ribbon that was certainly old and faded, but clean and smooth, and her face wore the same calm, peaceful expression.

She hung up her hood and shawl behind the door, then rolled up her sleeves a little. "My," she said, "what a lot of dishes. I guess you want them done first, don't you Mis' Holland?"

Soon Elsie toddled into the kitchen, and, in a very business-like manner, marched straight up to her mother. "Mamma," she said, "tan me stay here wi' Berta?"

"You'd be a bother. Go back with Fanny."

"Don't want to."

Then Mr. Holland came in. "Say, mother," he said, "can't I beat up cake, or stun raisins, or somethin'?"

"Good land!" retorted Mrs. Holland, irritatedly, "you'd better all on you poke right into this kitchen! I should think this house was big enough not to be crowded. Say, father, take Elsie away, so that Bertha and I can get things done up. It's nice and warm in the dining-room."

"Me don't want to!" said Elsie, emphatically.

"Come to think on't," said Mr. Holland, quickly, "I've got some chores to do in the barn." And out he trotted.

Elsie sat down in her little chair, and Bertha went on washing dishes. Suddenly Mrs. Holland turned around on the child to see what she was doing so quietly. "Good land, Elsie," she said, "what in the world are you watching Bertha for?"

"'Cause me like to."

"Well, that must be great fun. How is Teddy, Bertha?"

"Well, thank you. I left him with father."

"Your father hasn't any work now, has he?"

"No ma'am."

"And ain't had for some time, has he?"

"No, ma'am."

"It must be rather hard for you to get along?"

"Yes, ma'am; but we have done very well, so far."

"Be you goin' to have any Christmas?"

"O, yes! Teddy's going to have a tree."

"Hum," thought Mrs. Holland, "guess there ain't much poverty there. Father's a big goose to think there is. She reely acts as if she'd got a fortune to put on that tree."

Bertha worked for Mrs. Holland all that day and all the next day until late in the afternoon, when she started for home, with the pleasant chink of money in her pocket. It was only a dollar, but to Bertha it was of untold value, for it meant that she need not quite yet ask charity to buy her little brother food. She and her father could get along some way. There were a few potatoes yet left in the cellar, the only remainder of the product of their little garden. That was all there was to eat in the house—or in their part of it. She and her father could live on them while they lasted, but frail little Teddy couldn't. That night for supper Teddy had nice new milk to drink, and bread and, the greatest luxury of all, butter to put on it.

There was probably not a single person in Easton but who, if he had known of Bertha's circumstances, would have jumped to offer her and her father assistance. But the very idea of charity was repugnant to both. They knew, however, that the hateful truth must be known to others than themselves before long, for in a few days their month's rent was due, and there was no money to pay it.

Bertha had not been home long before Mr. Holland hitched up his family team and went to the depot for "John's folks." They made the big sleigh pretty full. There were John and his wife, Tommy, aged ten, Rosy and Bella, six and four respectively, and Grandpa Holland. There wasn't even room enough left for that proverbial "one more."

After a merry supper, the elder ones left the children cracking nuts on the kitchen hearth, while they talked over a very secret little plan to give the little ones pleasure.

"O, yes," cried Fanny, enthusiastically, "some one must be Santa Claus, and come and pay the children a visit. There's enough good stuff left over from our last year's theatrical club to just fit up a fine-looking Santa. And Uncle John's figure is just right for the part. Uncle John must be Santa Claus."

TEDDY'S TREE.

"Yes, yes!" cried her mother. "You must be Santy Claus, John."

Then big, burly John roared, and everybody laughed with him, except Grandpa Holland.

Grandpa Holland had been one of the merriest of the party since his arrival. Now he sat in his chair looking quite dejected and unhappy, just as though he had lost every friend he ever had on earth, and never expected to have another.

"Why, father," suddenly cried John's wife, "what's come over you so sudden? Don't you feel well?"

Fanny, her father and mother, and Uncle John turned their startled, anxious faces on the old man.

"No," he stammered, "I ain't—well. I—I guess—I'd better go to bed."

Anxiety gave place to alarm.

"Why, father," said John's wife, "you don't mean it, do you? Sick on Christmas eve, when we were going to be so jolly?"

"I know what 'tis," said Fanny's mother, confidently, "it's a sudden weakness. My currant wine will fix him all right in no time."

Grandpa obediently took the currant wine, but grew worse.

Bertha had now come over to help clear up the dinner dishes and wash them, and was stepping occasionally between the dining-room and kitchen. No one paid any attention to her, and her mind seemed to be intent on her work.

Suddenly, however, she stepped up to Mrs. Holland and whispered a few words in her ear, then moved quickly away. The woman stood transfixed with surprise and incredulity. She kept looking in a perplexed way from John to the old man. Then, on some pretext, she got the former out of the room, and held a short, whispered conversation with him.

He suddenly pretended to have had an errand outdoors, and then came stamping through the hall into the kitchen. "Say," he exclaimed, rubbing his hands over the kitchen stove, "you folks did a very thoughtless thing in choosing me for Santy, jest because I'm a big chap. Bless you, *I* ain't no hand with young ones. I'd scare 'em to death if they come near me. Now a real Santy, you know, understands children, and knows how to talk with 'em to gain their confidence. I couldn't do that no more'n nothin' in the world. There ain't ary of us could nuther, 'cept father. Father's the one that ought to be Santy. The fun'll be all spoilt if he's goin' to be sick."

Grandpa Holland half way raised his head. An expression of interest settled over his features.

There seemed to be all at once a sort of telegraphic communication between the members of the little company. "Why, yes!" cried one after the other. "What in the world were we thinking of! Grandpa Holland is the one who ought to be Santy. *He* understands children!"

"But he's sick!" regretfully cried John's wife.

"I'm better!" cried Grandpa, quickly. "I reckon the currant wine's beginnin' to take effect. An' 'twouldn't make no diff'runce if I was sick. I ain't a-goin' to have the children dis'pointed along o' me. I guess I kin stan' it."

Each glanced at the other understandingly, and yet with bewildered surprise. But the old man was quite chipper. Fanny, amid much laughter, helped him to don the queer rig and padded him to the proper bigness. Then after a little Santa visited the children and the fun commenced.

"Why," cried Mrs. Holland, suddenly, "we ought to have invited Teddy over. I wish I'd thought to speak to Bertha about it when she went home."

"The pritty little girl that was helpin' of you?" asked Grandpa.

"Yes, that was Bertha. Teddy's her brother."

"I could go an' make a special visit to him," cried Grandpa.

"Why, so you could!" said Mrs. Holland. "And I'll go with you, and wait outside till you come."

So "Santy" made his adieux to the children and slipped out. Mrs. Holland met him, and they went directly to Bertha's house. It was a very small, double house. On the side in which Bertha lived, a very dim light shone forth from the kitchen window. Mrs. Holland suddenly moved up to this window and looked in. Then she stepped back and said, "Well, well, well, I do declare!" Then she looked in again, and the old man looked in with her. The night was mild and the window glass quite clear.

The lamp in the room was turned very low, ostensibly to save the oil. Bertha's father sat on the opposite side of the room, his head leaning dejectedly on his hands. Bertha sat in a little rocker, with Teddy in her lap. An expression of extreme content and satisfaction was on the child's face, and as his head leaned back on Bertha's breast, his eyes were fastened on what to him appeared a glorious vision.

A tiny Christmas tree stood in a little box on the table. Strings of white popcorn were tastefully arranged about it. As for its other contents, there were three sticks of colored candy and one orange—nothing else.

So this was Teddy's tree! When Mrs. Holland observed it, and other evidences of poverty and want, her vision became so blurred that she could no longer see. She called Grandpa away, and they went up the road together, without making the intended visit.

Early the next afternoon, when Bertha went over to Mrs. Holland's to help with the dinner dishes, her face was radiant with happiness. "O, Mrs. Holland," she cried, there isn't a girl in this world so happy as I am this day! Father's got work at last. The Raybone Manufacturing Company sent their man down to offer him a job as night watchman. And you ought to have seen poor father cry over it. And somebody sent us a big box full of chicken and everything else, and we all had such a glorious dinner. And Teddy is so happy he doesn't know anything what to do. He thinks it was all Santa Claus' doings."

"And it was," said Mrs Holland.

But Bertha didn't understand, and she was so happy that she didn't even try to.

How Dame Nature Helped Bert.

S. S. JENNINGS.

Bert's folks lived on the old Duryea farm. They were not Duryeas, neither were they descendants of that illustrious family; they had merely rented the place from one of the heirs, and were struggling to get their living out of the soil. For many generations the Duryeas had lived and died in that ancient farmhouse, and it was strange that they were willing to have it occupied by an outsider, for descendants of the James Duryea who had built the house more than a hundred years ago abounded in that vicinity. You could scarcely meet a person there who did not claim relationship with the Duryeas, and the ones who were not so fortunate, boasted of the visits they had paid to the old homestead.

But all this has nothing to do with the story except to show that the place was well known by people living near and far. Bert Van Nostrand was the person I desired to tell about, and he was a boy of twelve, with bright brown eyes, chestnut, curly hair, and a pleasant manner that won friends for him wherever he went. He was never dressed in the finest of clothes, even on Sunday, for his parents found it all they could do to keep him respectably clad. Yet Bert was generally as happy as better-dressed boys, and if he ever sighed for finer apparel, no human being knew it but himself. Indeed, the lad possessed a sense of humor that caused him to pass lightly over disappointments which his poor clothing brought to him. Once when he was invited to go on a certain trip, he smiled gaily and remarked: "How can I? The trousers I have on are not good enough, and my others went long ago to the hospital for the incurables."

"Why, where is that?" his friend innocently inquired.

"The ragbag, of course," was the quick answer.

Bert's chief delight was in books. He was a diligent scholar at school, and a voracious reader when he could manage to find time to be so. But literary matter was very scarce at the house of the Van Nostrands, and sometimes the boy's father found it almost impossible to buy even his school books. At last there came a time when it was entirely out of the question. Bert was to be promoted to the study of several new branches just as soon as his father could afford to purchase the necessary books. However, it seemed as if that time were to be the dim, dim future, for day after day passed, and there was no sign of spare money. "If I could only go to work," sighed the boy, "I might earn something toward it." But there was so much work to be done at home that he had no chance to seek it elsewhere.

"Never mind," said his mother, soothingly, "an opportunity may come when you're least expecting it. Go right on with your duty, my son, learn what you can with the means you have, and something may turn up before long."

A day or two after Bert ran into the house and asked, anxiously, "May I go fishing with the boys? They're just starting over the hills. Do you think you could spare me?"

Mrs. Van Nostrand hesitated. She would gladly have given her permission, for Bert had few pleasures, but his father had left word that he expected a large pile of wood chopped by the time he came home that night. She had no small pieces on hand at the time, but she would have managed somehow, only she knew her husband would be angry with the boy if he left his work undone. "What do you think yourself, my dear? You know that old tree has been cut down, and your father will want to see plenty of wood chopped by the time he returns from the field."

"I should think some other time—" the boy began, but then he remembered that his mother would have to chop wood, if he went away. "I suppose I'd better not go," he added with a sigh, and then he went outside and tried to forget all about fishing. After working steadily for some time, he picked up what he meant to be the last piece of wood that he would chop that day, when something about it caught his attention. Very near the center of one round end was the figure of a heart made by Nature as perfectly as an artist could have drawn it on paper. He looked at the other end of the stick and saw that the heart was there, too, although not perfect.

"How queer!" thought Bert, "it must run all the way through," and he began to cut the wood into little flat pieces, and found that on every one of them was the figure of the heart.

"What have you found that is so interesting?" some one asked, and looking around, Bert saw the man that kept the village store. He showed him the wood.

"Why, that's quite a curiosity," he said; "look out for them. Many a person would be glad to have one." When, believing that a little change would be very acceptable to the boy, he went on, "By the way, why don't you try to sell them? I'll give you ten cents myself for one, and, if you like, I'll take them to the store and get my customers to give you ten cents apiece for them. This old place is so well known that I've no doubt they'll sell readily."

"Oh! thank you!" cried the boy, in great delight. "And if they do sell, I'll have money to buy my books! But don't you think it would be a good idea for me to print the name of the place and the date on them?"

"Yes, it would; have them ready by the next time I come."

Bert's parents were very much surprised when he showed them the pieces of wood with the heart on them, and they rejoiced with him in the thought that his discovery might bring him money for his books. As the storekeeper supposed, his customers were glad to have such a curiosity, especially as it came from an old tree that they knew so well, and in a few days the stock was all gone, and Bert went down to the village to purchase the much-needed books. He found that he had sufficient money to get paper, pens, ink, and lead pencils too, and when he went home with all of these things, he felt that he was as rich as a king.

"I won't despair again, mother," he said, as he lingered lovingly over the new volumes. "I remember that you told me my opportunity might come while I was about my duty, and it did when I least expected it. If I had not chopped that wood, some one else might have done it and never noticed anything curious about that piece."

Bert is several years older now, and he owns a small library in which are many valuable books, but right over his mantel, hanging by a blue ribbon, is a small piece of wood which he values as highly as any volume on his shelves, and he calls it "Dame Nature's Gift."

Changeable as the Mountains.

That would sound like a very queer comparison to make, wouldn't it? Yet men who have studied the crust of the earth have proved that the mountains are constantly changing.

On the tops of some of the giant peaks of South America are found great beds of the shells of minute sea creatures like those which are living in the oceans to-day at great depths below the sea.

So it is plain that these mountains, now rising so grandly above the sea, were once its floor, and that through many ages they have been gradually, but unceasingly, rising, and perhaps are still doing so. For they are never still.

Mr. Darwin says that "daily it is forced home on the mind of the geologist that nothing—not even the wind that blows—is so unstable as the level of the crust of our earth," whose stately elevations we have been wont to call "the everlasting hills."

Dipping Candles.

ALICE E. PINNEY.

Priscilla Marlow sprang out of bed, one cold November morning, and, running to the window, she scratched a hole in one of Jack Frost's paintings, and peeked through the window-pane.

It was snowing hard. Already the snow was piling up in drifts by the fences, and the wind was blowing a gale. The only sign of life about the dooryard was Bruno, the dog, rolling over and over in the snow, in a transport of joy, as he shook his coat free of the fast-falling flakes, and the narrow footpath that Obadiah had scuffed on his way to the barn.

Priscilla hastily put on her warm knit stockings, stout shoes, and homespun flannel dress, and ran down to the kitchen, where a bright fire burned in the big fireplace, and her mother was preparing breakfast.

Priscilla was a genuine country girl, and did not mind the cold, while it seemed to her that stormy days were the pleasantest of the whole winter, for her mother always had something delightful planned to do on stormy days. She wondered what it would be to-day? She did not have long to wait before she found out. They were scarcely seated at the table, which was drawn up near the open fire, and on which the golden brown johnny-cake, fried ham and eggs, and smoking-hot potatoes steamed, ere Mrs. Marlow broached the subject of dipping candles. Her stock was running low, and she must lay in a supply for the long winter evenings that were close at hand.

So, immediately after breakfast, Mr. Marlow brought the kettle of beef tallow from the cellar and hung it on the crane over the fire. Johnny—Prissy's brother—went to the barn for some bran to sprinkle the floor, and her mother began to cut off pieces of candle wicking of the desired length.

How Priscilla did hurry with the dishes that morning! A plate slipped from her hand, but she caught it again. She was very careful after that, for it would never do to fall into disgrace when dipping candles was in prospect. As soon as the dishes were put away, her mother gave her some wicks to twist on the candle rods, and, as the tallow was melted, they prepared to dip.

Two of the old high-backed chairs were placed in front of the fire, and the floor between them was liberally sprinkled with bran. The long wooden rods, with half a dozen wicks dangling, were laid across the backs of the chairs. Then the wicks on each rod were dipped in the melted tallow. Only a small quantity clung to the wicks at first, but as fast as they cooled they were dipped again and again until they were of the required size and shape. If too much tallow clung to the end of the wick first dipped, they were held over the fire until the tallow melted and ran down to the other end. When the candles were as perfect as time and patience could make them, they were slipped from the rods and fresh wicks twisted on.

Prissy was very much interested in the dipping, but not so much so but that her nimble fingers kept a supply of wicks until finally her mother said there was enough for every day use, and she might twist a few to use when they had company. This was a great treat to Prissy, as her mother had always twisted these before, but she showed Prissy how it was done. She took three wicks and twisted them all together for two or three inches, then each wick was twisted separately to the end. It required considerable care to dip these, but when finished, the candle, which commenced with one large wick, branched out into three candles. When all three were lighted at once they were considered quite grand for those days.

The light of one candle was considered sufficient for ordinary occasions, and two candles were considered extravagant, while three were only indulged in on festal occasions. When we remember that the light from the open fire made the room almost bright enough without other illumination, we realize that we are not so much ahead with our bright lights and the coal furnace in the cellar.

They were so busy that the men were obliged to be satisfied with a light lunch at noon, but after Mrs. Marlow and Prissy had packed the smooth, shining candles away in their boxes, they cooked a good, substantial supper. Prissy had been so interested in her work that she hardly knew when the storm ceased, but when she ran to the door to call the men to supper the stars were shining and the new-born moon was sinking out of sight behind the frosted hills, for all the world as if ashamed that it wasn't bigger; and when she went in one of the new candles was lighted and stood on the table, though, as Mrs. Marlow said, there were a few old ones left, but she thought it would please Priscilla.

Father's Presents.

They were talking about Christmas presents, the girls and mother and I, when father came in. Then we changed the subject just a little bit, because it was of father's presents we were discussing. Father sat down by the stove and rubbed his hands—he had just been out at the barn—and a queer expression slowly settled upon his features.

"Say, mother, and Ned, and girls," he said, "I don't want any on ye to get me any presents. 'Tain't no use, you know."

"Why, father," said Lena, in an aggrieved voice, "we always get you useful presents, don't we? I don't myself believe in things that are not useful."

Father's eyes twinkled. "Yes," he said, "but I sometimes think they are just a little too useful, you know."

Nell shrugged her shoulders impatiently, but mother said, "Let father have his little joke. What is it this time, father?"

The old gentleman, having warmed his hands, settled himself back comfortably in his big chair, and his eyes twinkled more than ever.

"Well, let's see," he went on, in a ruminating manner, "do you remember the dozen hemstitched han'kerchiefs that you give me last Christmas, Leny? I guess I used one on 'em just once. Some way or other (with a genial, impartial glance at the company), Leny and Nell have been usin' of 'em, and I've been usin' of Leny and Nell's old torn, stained ones. He, he, I don't know jest how 't was, but it's a fact! Then, Ned, do you remember the compass you got me for a birthday present last June? It was a nice little compass, and I guess a feller about your size thought so, too, for he's ben a-usin' of it ever sence. Then, let's see, there was the silk han'kerchief that mother give me at birthday, and I put it away choice-like, and the furst thing I knew, Leny was a-wearin' of it inside her jacket. Yes, my presents are all useful, a leetle bit too useful, mebbe. See the point, don't ye?"

Father's next presents had his name written on each of them, and none of us ever again thoughtlessly used the dear old man's things.

Solving Puzzles.

JENNIE JAMESON.

Do you try to solve the puzzles in your papers? If you do not, begin at once. You do not know what you miss by not working them out. No matter what they are, try them. It is a recreation that grows on one in interest, and in a very short time you will feel yourself deeply interested in them. Most people think they are only for the young folks, so do not look at them. They are for the young folks, of course, but who among us does not want to be still called young? If you have children you surely cannot afford not to be interested, for they will look to you for help. Brush up your memory and help them out. A little study of the dictionary is good for us all, and a glance through the geography will bring back the memories of bygone days in a very pleasant manner. Many a mother has written, thanking the papers for the puzzles, and hoping they will be continued, for they are a great help to the children in learning application. I have before me now, a letter received not long ago, from which I will quote a paragraph:

"I want to thank you for your puzzle department. It has been a great help to Willie in getting him interested in his studies. History was always a hard, dry study with him, but since he has been working out puzzles he has taken such an interest in the historical ones that his school lessons in that branch of study are now a great pleasure to him, and much more easily learned."

I remember one lawyer who always sent in answers, but never succeeded in getting a prize. He said it was a great treat to him to throw off the cares of business and make believe he was a boy again. He always had in every letter a pleasant word of suggestion to the editor, which was often taken advantage of.

Many doctors, too, try their hand at our puzzles, and they soon get as interested as the young folks, but they are not as successful, for they either do not have enough patience or time, and their lists are usually incomplete. They always say they are not working for a prize, but it is my private opinion that they would take one fast enough if they could get it. But the boys and girls look out that they don't.

The neatest lists almost always come from the girls. Do you hear that, boys? The girls seem to take more time to prepare their lists, while the boys get the right answers and see that the spelling is correct, and then send along the list, never minding if it is not so tidy as it ought to be. Usually there are more answers from girls than from boys. Why this is so I do not know unless it is because girls are in the house more than boys and spend more time in reading.

Many of the children who were working out puzzles years ago, are now parents, but their names are still seen in the papers as successful contestants in the prize contests. I know one woman who takes all the papers she can get hold of that have puzzles in them, and she has four girls and three boys, neighbors' children, who come in two evenings a week to help her, and they work out every puzzle they possibly can, and send to the different papers. She says she is amply repaid for her outlay for the papers by the pleasure the young people get out of it.

I call to mind one old gentleman, eighty years old, who was a constant contributor to the puzzle department. He was very good at working them out, and sent in some that both pleased and puzzled the young folks. His death was mourned by many girls and boys who had learned to love him through his puzzles.

I believe this department of literature has been of more service, as well as pleasure, to me than any other part of the newspaper or magazine. It has kept me constantly looking up historical facts, Bible characters, dates of famous battles and such things, until I like to do it better than to read the trashy books with which the country is flooded, and which can do no one any good. Get interested in this kind of work and you will soon find that there is more fascination in it than there is in continued stories, and that you will look forward to your next puzzle with much more interest than you used to for the next installment of the sensational serial story.

Jim's Excuses.

Jim (Mr. B.'s colored boy) was never prompt on returning from errands. If the distance was only a mile or two, he would saunter back after many hours. One day he rode on an old horse to the village (two miles away) for the mail. The horse, while not remarkable for swift traveling, could easily have made the trip in less than two hours. Hours passed and the family were getting anxious.

At night Jim returned with a very satisfied air. Mr. B. said to him rather sternly, "Now, Jim, you must stop this habit of staying so long when I send you for the mail. What kept you so late?"

"Yes, sah," complacently replied Jim, "I reckon I was late, for I was on a late horse, sah!"

Mr. B. asked him one day why he did not cut the wood. (Now this was Jim's bugbear—any excuse to get off with this work). Jim replied very sullenly, "How can any one cut wood with sore hands like I's got, I should like to know!"

Shortly afterwards, as Mrs. B. was walking about the yard, she came upon Jim shooting marbles with some boys, and using his hands quite freely. "Why, Jim," she said, "I thought your hands were too sore to cut wood?"

"Yes, ma'am, they *was*, too, but playin' marbles don't hurt 'em like cuttin' wood, for I forgits all about the sore places when I's playin' marbles, you see!"

Slate Pencils and Marbles.

The quarries of Steinach and vicinity, in Meiningen, Germany, supply slate pencils for the whole world. Government officers run these quarries, also the slate quarries at Lehesten, and

ship about 270,000,000 slate pencils annually. An immense number of playing marbles is made at Sachsendorf, in Germany, the stonebreakers preparing the marble stones for the mills which grind and polish the marbles against one another.

Our Maggie.

J. L. TOWNSHEND.

Bertie came running into the house, his big brown eyes glowing with excitement. "Frank says I can have his magpie for only 15 cents." It was a little magpie that a neighbor's boys had taken from its nest in the cañon. "I'll make a cage, mamma, do buy it," pleaded Bertie. "And I'll feed it and take care of it," said Amy. So to please the children mamma bought the bird.

Amy found a basket for it, and mamma made a cosy nest of flannels in which it cuddled down and went to sleep. Bertie soon found its shining black eyes peeping out of the basket. "Magpies eat worms, crickets, mice, or any kind of meat," said mamma, giving some meat for the bird to Bertie, who cut the meat in little pieces and dropped them into the bird's bill. When it wanted more it would open its mouth very wide and squawk. In a few days the magpie would sit on the edge of the basket and watch the children. When any one came near the basket it would raise and flap its wings and go kirr-r-r-r to show its pleasure.

One day it hopped down from the basket on Bertie's shoulder. Then it became more and more tame and would fly on mamma's shoulder or head and kirr-r-r-r and show its love by cuddling up close to her face, and caressing her with its bill. Soon it would follow any one all over the house, and watch to see what was being done, turning its head from one side to the other and peering out of its shiny eyes as if it was carefully learning.

One of the children named it Maggie. When we called her she would come hopping along flapping her wings and expecting something to eat. One Sunday when all the folks, except mamma, were at Sunday school, a visitor came in, and, while talking with mamma, some one in another room began calling, "Mag! Maggie! Maggie!" "Who's calling Mag?" mamma asked. Maggie came hopping out and strutted up near mamma and cried, "Maggie! Maggie! Mag! Mag!" just as plainly as a person would have said it. O, how it startled mamma and the visitor! They had never heard a magpie talk, and did not expect Maggie to, as no one had tried to teach her.

The magpie soon learned to whistle and call the dogs, crying "Heah! heah! huh!" and laughing in great glee at the dogs that ran near at her call. When mamma went in the garden to attend to her flowers, Maggie would alight at her feet and cry, "Ma! Ma! come on! come on!" and hop along by her side. She would watch mamma's needle with great interest, or would perch on the arm of the sewing machine and peer about for something, and when mamma laid down her thimble would dart and take it and fly out doors where she would hide it. Every day she made some one chase after her to recover something she had stolen. When the bright flowers began to open on the phloxes and nasturtiums she picked every one, and became so mischievous that mamma declared it could be endured no longer.

So Bertie made a cage from a large box with a front of woven wire and Maggie was imprisoned. She had grown to be a large, beautiful bird, with a very long tail. Her head, back, tail and wings were lustrous black, changing, as the light reflected from the black feathers, into green, purple, violet or golden iridescence, while her breast and part of her wings were snowy white.

She was a very clean bird and was given a daily bath in a large basin, in which she would dive and flutter, splashing water all over her cage. Then she would fly up on the perch and carefully dry and plume her feathers. During the winter Maggie loved to fly down in the snow, spreading out her wings and tossing the snow all over her.

Once when a dog was asleep by its master's wagon, Maggie adroitly sneaked up and pulled its tail, darting out of sight behind the box. The dog looked up, saw nothing, and composed itself again in slumber. Maggie darted down out of the wagon box, pulled the tail, and again quickly disappeared. Again and again Maggie pulled the dog's tail until the poor brute was obliged to go away completely puzzled to know what disturbed him. One day Maggie was standing in the front gate when she saw a little girl going by with a hole in her stocking. Quick as a flash Maggie darted out and picked the girl's leg, through the hole, frightening the child and making her scream with pain, while Maggie flew up on the fence and laughed.

Once Maggie was perched on the front fence listening to the remarks of two men who were talking about her. One of the men, who was a stock raiser, and had been greatly annoyed by the flocks of magpies that sometimes killed his cattle by pecking them to death, exclaimed, "I tell you they're the meanest birds on the face of the earth!" Just as he said it Maggie reached over and grabbed the back of his hand, pinching it severely till it at once became black and blue, and then darted away. The spectators had a hearty laugh at the stock raiser, and wondered at Maggie's apparent resentment.

Maggie found that the old cat had some kittens under the porch. Every time the kittens ventured out Maggie had rare sport catching them by the tips of their tails as they attempted to run back and then throwing them out again. Maggie's love of mischief grew till she became cruel. Every toad she found in the garden she would slowly peck to death. She was as good a mouser as the cat, and greedily ate all the mice she caught. She would even kill young chickens whenever she found one away from the old hen, and once, when she had captured a chicken, the old hen came to

MAGGIE.

the rescue, and Maggie received a pecking in turn that nearly killed her. A man once offered Bertie $25 for her. Mamma would gladly have given her away, she was so mischievous, but the children all objected, and Joe said, "Don't let her go, mamma, 'twill be just like parting with one of the family." So we kept our Maggie, and she is now three years old and as mischievous as ever.

Lydia's Stint.

PAULINA HAMMOND.

A long time ago, when my grandmother was a little girl, her mother—as did many other mothers of that time—used to give her a stint; that is, a certain amount of work to do. Lydia's—that was grandmother's name—was to spin the bobbin of the spinning wheel full of yarn. Not until she finished her task was she allowed to go out and play.

Lydia thought this very hard, and when she would look out of the window and see the boys at work in the fresh air, it seemed to her that her stint was the very hardest of all, having to stay in the house, listening to the dull hum of the flying wheel.

One day her longing overcame her. It was an ideal day; the scent of lavender and cinnamon roses floated in through the open window, the very breeze that fanned her rosy cheek seemed to whisper, "Come out, come out!"

Suddenly a thought entered her head. Why not wind a cloth on the great bobbin, and then spin enough more yarn to cover it up? In this way her mother, glancing carelessly at the bobbin, would think that it was full, and never give it a second thought. So intent was she in her plan that she noticed not the shadow in the doorway, nor did she stop to think that her usually merry voice was hushed with the excitement of wrong doing.

It was this silence that made her mother glance in, as she went past the door, and seeing, was struck with horror to see her daughter thus trying to deceive her. Nevertheless, she watched her until she finished, and then walked noiselessly from the doorway.

Lydia, unconscious of impending danger, donned her little yellow Shaker bonnet and ran out to help the boys, who were picking strawberries for supper. Nevertheless, it was with a heavy heart that she entered the house for the evening meal, and many were the anxious glances towards the spinning wheel, which stood in the corner by the fireplace.

"Thee finished thy spinning earlier than usual, Lydia," remarked her mother, warily. She had noticed the stealthy glances and thought a confession of it would soon come.

Lydia only grew furiously red. "Yes, ma'am," she answered, with her two blue eyes fixed resolutely on her plate.

"I'm glad my little daughter's so industrious," was the next blow, dealt by the father; "and quick, too," he added.

Lydia gave a despairing glance at that terrible bobbin, and burst into tears.

"I was'nt quick," she sobbed out. "I wound the bobbin with a piece of cloth, so's not to have so much to do; but I'll never do it again as long's I live, truly."

It came out in little bursts, but they all knew what it meant very well.

"Lydia," her father said sternly, "go to thy room, and to bed immediately I am disappointed in thee."

Poor, little Lydia stumbled up to her tiny bed room under the eaves, and obediently went to bed but not to sleep. Her sobbing had ceased, and to all appearances she was asleep, but Lydia was not. She heard first the boys and then her parents ascend the stairs, on their way to bed. Her mother came last, paused a moment at Lydia's door, and thinking the child asleep, went in and leaning over the bed, kissed her refractory little daughter's wet cheek very tenderly and softly.

This was too much for Lydia. She flung her arms round her mother's neck and cried, "O dearest mother, wilt thou not forgive me? I cannot sleep till thou sayest yes."

Her mother smiled to herself a little and said: "Yes, Lydia, I do forgive thee, but be more thoughtful in the future."

The mother stooped and kissed her again, then left the room. Lydia cuddled down and was soon in slumberland. She had been forgiven.

"An Open Door for Safety."

This is a German proverb, and refers to the fact that people who have much to lock up are not so safe as those who have not, but in countries where there are many earthquakes the proverb has another meaning.

A gentleman who spent many years in South America told us that he had learned never, in an earthquake country, to sit in a room with a closed door, because the shock sometimes displaces the walls so much that the doors become jammed or cannot be opened, while the ceilings may fall in and crush the inmates of a house like rats in a trap.

Mrs. M. was on her way down street one day, when she met two chubby little boys playing by the wayside. They looked almost exactly alike, yet she knew they were not brothers. "Good morning, Walter," she said to one of them. "I see you have a chum." "Yes, ma'am," said Walter. "He's my cousin." At that the other little fellow came excitedly forward, and pointing to Walter, cried, "And he's *my* cousin, too!" "O, now I see," said Mrs. M., laughing.

OUR LITTLE FOLKS.

Willie's Sled.

EFFIE W. MERRIMAN.

Willie wanted a sled for Christmas, so he sat down and wrote Santa Claus a long letter. He had never learned to write, and he could not read very well, but he believed Santa Claus would know what was meant by the queer marks on the bit of crumpled paper.

Then Christmas day came. In, and above, and below, and all around his largest stockings, Willie found enough gifts to have made half a dozen boys happy, if none of them had been expecting a sled. But there was no sled. Willie looked under the sofa, and under the piano, and everywhere, but there was not a sign of a sled. Willie sat down in his little rocking chair and burst into a flood of tears.

"Why, Willie!" exclaimed his mamma, "are you sick?" She could not believe that anything but pain could make a boy cry when he had so many nice things fresh from Christmas land.

"I hate Santa Claus!" sobbed Willie. "He didn't answer my letter a single bit!"

Mamma was more astonished than before, and she asked Willie to tell what he was talking about.

"Why," she said, when he had told about the letter, "perhaps you did not send it early enough. You know it takes almost a week for a letter to go from us to Aunt Mary."

Willie's face brightened. A new thought had come into his head.

"Mamma," he said, "I do believe Santa Claus will get that letter in time to bring the sled on New Year's day! If he does, mamma, you will have to let me keep it, or he might be very angry."

As soon as papa came home to dinner Willie had a talk with him about it, and papa promised to write a note to Santa Claus, himself, and ask him what he intended to do about Willie's letter.

Sure enough, on New Year's day Willie found a sled tied to his stocking! A note from Santa Claus was fastened to the sled, saying that Willie must not only be a very good boy, but he must try to make some one happy.

Papa went with him to a long hill, where a great many boys and girls with sleds were having the finest kind of a time. He felt very big when papa allowed him to ride down the hill alone. Two weeks later, papa told mamma that he believed it would be safe to allow Willie to go to the hill alone. So one day, when nearly all the children in town had gone to school, Willie got permission to go to the hill. There was no one else there at the time, but it was not long, before some one came.

He was a ragged boy, and he was larger than Willie, and he looked as if he knew better how to take care of himself.

"Hello, Bub," said the boy. "I want a ride on that sled."

"I haven't had enough rides yet, and you can't ride," replied Willie.

"Maybe I can't," said the boy, "and maybe I can. You are nothing but a baby, and I can stand you on your head in a snow drift. I can put you so deep down that you can't get out before spring."

"Guess I could wiggle out," replied Willie. "I can wiggle awfully! Mamma can't hold me when I get to wiggling, and this soft snow can't squeeze half so hard as she can!"

The big boy laughed, scornfully. "You wouldn't say a word," he said, "if you had ever seen me jamming boys into snowdrifts."

But Willie was not to be frightened easily, as the big boy soon saw, and he decided to try another plan.

"I never had a sled, and I never had but two rides in my life," he said, pretending to wipe tears from his eyes. "Come, now, be a good little boy, and lend your sled to a poor fellow who hasn't any father or mother, or sled, or anything that's nice."

Willie's heart was touched. "You can have two rides, if you want them," he said. "Santa Claus told me I must be good to somebody, and I suppose it might as well be you."

"I suppose Santa Claus meant me, all the time," replied the boy. "He and I are mighty good friends! I think he will not bring you many more things," he added, after a moment's reflection.

"Why won't he?" asked Willie, in alarm.

"Because you are never willing to do as he wants you to."

"Y , I am, too. I do everything I know about."

"Down where I live, in the other end of the city," said the big boy, "there is a poor little sick chap who never had a ride in his life. Santa Claus feels very bad about that boy. He was going to give him a sled this year, but he didn't have but one, and he gave that to you. Of course I don't know what Santa Claus would say if he found out how selfish you are, but I should think he would not like it very well."

"How long would that boy want the sled?" asked Willie. There was a great struggle going on in his little heart.

"Not more than two hours," replied the boy, "and then you could have it all the rest of your life."

"Wait until I ask mamma if I can go with it," said Willie, "I can help pull the boy up hill."

"Oh, no," replied the boy, "that wouldn't do at all. You would get tired. Besides, if I don't run I shall keep the sled too long."

"Well," said Willie, "you may take it without me; but please be sure to bring it right back as soon as the boy has had four rides."

The big boy promised, and hastened away with the sled, while Willie ran home to tell his mother about lending it, and to ask if she thought Santa Claus would be pleased.

"MY DEAR JACK FROST HAS COME!"

"He would have been better pleased," she said, gravely, "if you had asked me if you might lend your sled. Little boys should not use their own judgment about such things."

It was almost time for Willie to go to bed, yet the sled had not come. He could hardly keep the tears back, for he, too, was beginning to fear that he should never have another ride on his beautiful Jack Frost. He was allowed to sit up a little longer than usual that night, although papa had told him that the boy would not be likely to bring the sled so late at night, and mamma had said that, if it did come, it should be carried right to his room. But he begged hard to sit up just half an hour longer, and promised to go to bed without a word at the end of that time, whether the sled came or not. Only five minutes more of the half hour remained, and still the sled had not come. Willie stood by the window with both hands shading his eyes, so that he could look out into the street. His papa and mamma were so sorry for him that they could hardly keep tears from coming into their eyes. Papa was just saying in a low voice to mamma that Willie should have another sled, when he was interrupted by a shout of joy from the little boy.

"Oh, papa, Oh, mamma, it's come! My dear Jack Frost has come!"

There was a ring at the door bell, and when papa opened the door a ragged boy stepped into the hall, dragging Willie's sled behind him.

"Oh, boy!" exclaimed Willie, joyfully, "you found me at last, didn't you? I was afraid you were awfully lost! Did the poor sick boy have a nice ride?"

"There wasn't any sick boy. I told a fib, just to make you lend me your sled. I was going to keep the sled forever and ever, but I couldn't do it, because it would be mean and wrong, and I had to keep thinking how good you were to lend it to me. I don't want it any more. Good-by."

Our Puzzle Corner.

AN AFTERNOON WALK.

My niece and nephew, Mary and James, took a walk with me one afternoon, and as we passed down the pleasant country road I called James' attention to a bed of 1 (young knights and a knob).

"Yes, they are very pretty, but I was thinking more of those 2 (an obstruction and a small fruit) bushes than of anything else," said he.

"I see them, too," said Mary, "but don't you think that little patch of 3 (to confine and a badge of mourning) is worth looking at?"

"Certainly," I replied, "but while we are admiring all the beauties of nature, don't miss that hedge of 4 (a color and a spine)."

"Yes," replied James, "and just over the other side of it is a very handsomely shaped 5 (an animal, part of the human body and a fruit) tree."

"That little 6 (because, to obtain, myself and denial) that grows near the root of that tree is one of my favorite flowers," said Mary.

"The 7 (a fop and an animal) is my favorite wild flower," I replied, "but I also think the 8 (a bird and to incite) is very pretty."

"Yes, they are," said James, "but don't you think the 9 (the early part of the day and honor) is a handsomer flower than either?"

"Some may think so," replied Mary, "but the 10 (a mistress and a light shoe) is to me a far handsomer flower."

Just then James caught sight of something growing in a shady place near an old barn, and asked me if it was not a 11 (boiled Indian meal and freedom to act). I went and looked at it, but found it was only a 12 (reptile and to ramify), but growing near it I found some 13 (to work slowly and a forest), which I wanted for medical purposes. The children helped me gather what I wanted of it, and while doing so many found some 14 (a wise man) from which she said she should make some tea when she got home, as she was very fond of it. James left us to see if he could not find some 15 (mournful and gentle), but he did not succeed.

Name the 15 varieties of trees, shrubs and flowers mentioned in this ramble over the country road. Remember that in case of a tie, the neatest prepared list will be the one to take the prize. All answers must be mailed not later than January 1, 1894, and must be addressed to Puzzle Editor, AMERICAN AGRICULTURIST, 52 and 54 Lafayette Place, New York. The prizes will be: $3, $2, a year's subscription to the AMERICAN AGRICULTURIST, and two useful books.

THE PRIZE WINNERS FOR SEPTEMBER.

First prize—S. Bernhardt, Massachusetts.
Second prize—F. M. Mitchell, Ohio.
Third prize—William H. Danforth, Massachusetts.
Fourth prize—Harriet E. Fiske, Connecticut.

THE ANSWER FOR SEPTEMBER.

SABINE
AETIUS
NYERUP
SCARPA
OCONOR
VERNET
ISOLDE
NAPIER
OVANDO

Some gave Igerne as the answer to 7 to 16, but she was the mother of King Arthur, and was no relation to King Mark.

Harry's mother dropped a quinine capsule, and she asked him to hunt it for her. He looked under chairs and table, and at last finding a part of it he gave it to his mother, saying, "Here, mamma, is the 'cap,' but I can't find the 'sule'."

A Winter Day on a California Ranch.

I wanted to see something of life on a California ranch, and stopping in the heart of the Sacramento Valley, the great grain-growing section of the State, I accepted the invitation of almost the first rancher I met to go out to his place and stay a few days. "Stay a week anyhow," said he, "and if you like the place, stay all winter." Everything is large in California, and the hospitality of her pioneer settlers largest of all. I was afraid my host might take offense when I declined to accept lodgings in his large and elegant residence, but my explanation that I had worked on a farm when a boy, and wished to see ranch life from the standpoint of a hired man satisfied him on that point, and after supper I betook myself to the "bunk-house" to share the blankets of one of the "boys." The boys numbered a dozen or more strapping fellows, mostly young men from the East who had come to the coast to make their fortunes. I found them gentlemen to the last man, though bluff and hearty in manner, and as frank and free with a stranger as with each other.

The bunk-house was provided with a stove, several rough board tables and plenty of boxes and benches to sit on. Two lanterns hanging from the ceiling lit up the room. Blankets jerked off the bunks were spread over the tables, several decks of greasy cards, taken from some fellow's trunk, and the boys grouped themselves about the tables to while away the long winter evening in games of whist, seven-up or draw poker. There was no gambling. All was in fun, though I noticed that the players at the poker game held on to their beans with great zeal, and when some lucky fellow raked in a "jack pot" of a dozen or two big lima beans his satisfaction was as deep and noisy as though each bean had been a gold piece. All spread their blankets on the straw bunks and retired at an early hour.

Long before there were any signs of daylight the cook's big bell woke me, and the men began tumbling out of bed. What's the matter, boys," I asked. "Is there a fire somewhere?" The boys roared. "A fire?" said one; "yes, there's a fire over at the cook house and has been for an hour, and you'd better roll out and get into your togs if you don't want to eat a cold breakfast." Following the men to the barn I watched them curry and harness their eight-mule teams. It took them just about fifteen minutes to do it. The "chore boss," the man employed on every big ranch to feed the stock, keep the stables in order and do odd chores about the house, had fed the mules their barley an hour before. Going over to the house we washed and combed under a big fig tree and filed into the dining-room. Breakfast, consisting of bacon and eggs, potatoes, hot biscuit and butter with strong coffee, was served by a Chinaman in flowing blouse and pigtail, and before the first streaks of daylight began to show in the east, each man had his team coupled together, and mounting one of the leaders was on the way to the day's work. It was a long way to the field and day broke before we reached the plows.

I thought I was a pretty good teamster, but could not restrain a laugh as I thought what a mess I should have made of it, if I had been sent to the field to plow with one of those big teams. "How do they ever manage to hold so many lines?" I thought as I watched the men hook on to the plows, which were coupled in gangs of three and mounted on wheels with a board across the top for the driver to stand on. The mules were hitched two abreast with a long chain running the length of the team. Short chains attached each mule's whiffletree to this long chain, and the animals were kept a proper distance apart by a stretcher or four-foot stick between these short chains. Imagine my surprise when I saw each man fasten a single line to the bit of his near leader and run it through rings on the headstalls of the near mule of the other three spans, back to his stand on the plow, and start the team along the furrow. It is really surprising to see one of these teamsters handle his eight mules with that single "jerk" line. A steady pull means "haw," a sharp jerk "gee," and the leaders know it as well as the driver, who will mount his plow and turn a furrow as straight almost as a bee-line in striking off a new "land" across a field a mile in length.

The teams once started never stop until the bell rings at half-past eleven, when the men go to dinner, starting for the field again at one. No stop again as long as daylight lasts. As I said before, "Everything is large in California," and the day's work of the ranch hand is at the top of the list. Coming to the house at night, the teams are watered, stripped of their harness and left to the care of the chore-boss. It appears strange to an Eastern farmer that eight and often ten mules should be required to pull three twelve-inch plows. But the adobe soils of California are very stiff and hard to stir. Mules, too, are plentiful and cheaply raised. At the age of two years in this climate they are ready to go into a plow team, and hired help costs more here than anywhere else in the United States; hence, all work is done with big teams that fewer men may be needed.

Eastern farmers haul grain to market with two horses and a single wagon. Here, one man drives six to ten mules, hitched to two or three wagons coupled together as bob-sleighs are in the East. When harvest time comes, I would like to see a New England farmer boy wake up suddenly and find himself for the first time in the middle of a California harvest field. As he watched the great combined headers and threshers moving across the fields, cutting a swath sixteen feet wide, leaving the threshed out straw and the sacks of grain in its track, and drawn by a score of mules, he would have to pinch himself more than once, I am afraid, to make sure he was not dreaming, and that the animals in his father's barnyard had not become tangled up in all the farm machinery on the place and were stampeding across the fields with the mower, the reaper, the horserake and threshing machine in a bunch at their heels.

MYRON B. GIBSON, Sutter Co., California.

The Leechee in India.

This delicious fruit, although sometimes classed among nuts, is not a true nut, but a fruit. It is a native of China, but was brought from thence many years ago and is now raised in various parts of India, but especially in the Province of Bengal, where it grows to perfection. The trunk of the tree is small even when of considerable age, with numerous long branches, the foliage dense and the leaves long and slender, and of deep green color. The shrubs begin to bear when only six feet high and two or three years old. The old trees reach a height of thirty to forty feet. The fruit is of the size and shape of a large plum with a rough, thin, scale-like rind, which changes from a bright green to a beautiful red tinge when ripe. In the center is an oblong, smooth, black stone. The fruit surrounding the stone is white, rather tough, resembling the white of a hard-boiled egg, but full of fragrant juice. When ripe, the skin can be pricked with the finger-nail and easily removed. After being gathered and allowed to dry, both the skin and fruit turns to a dull green color. The dried fruit is to the fresh and ripe, what a dried apple is to a ripe, mellow one, just from the tree. This fruit is a favorite with the birds. While the fruit is yet green, long bamboo poles are planted slanting all around the tree, and over them a net, like a fish net, is placed to cover the whole tree. The fruit sells in the Calcutta market at six to eight annas a hundred, i. e. twelve to sixteen cents. Up country, a thousand miles from Calcutta, where this fruit is scarcer, I have known the crop of one tree, but of a very superior kind, to be sold for $50. The mango is the finest fruit in India, and the leechee is the next best.

I. L. HAUSER, Calcutta, India.

New Zealand Flax at Home.

New Zealand flax attains its greatest size on low, rich, swampy flats of which we have large areas in the North Island. It is not, as has been stated by a correspondent, a shade plant. It is not in any way an under growth, but is most distinctly an open land plant. I have seen a few plants growing under trees, but it has always been of a very poor quality. There are, I believe, four varieties of it—one of which grows on edges of cliffs and other dry places. So that we have it growing in extremes of situations as far as moisture is concerned, but not under shade. Like many of our native plants and birds, I fear it is fast disappearing before English grasses and the flax-mills.

In New Zealand the seed is very easily obtained, and grows as well as cabbage plants in a bed or box. The old plants transplant, too, without any difficulty. Grown along the edge of a stream or sloping bank it looks very well as a fine contrast to the pampas grass, *Gynerium argenteum*. There are some variegated kinds that look very well in a garden, and are just as useful for tying purposes.

S. F. ANDERSON, Hawkes Bay, New Zealand.

Peasant Farming in Normandy.

The great question in a densely populated country like France is how to make the most of comparatively little, but the Norman farmers have much more in many ways than the American farmer, for instance, even in an extremely dry season like the past, they harvested three crops of hay. They also cut hay from their orchards. They have two and three crops of peas, beans and other vegetables, and of fruits like strawberries. With their other fruits, such as pears and apples, when they desire especially fine, large specimens, they do not allow the trees to grow naturally, but instead they take the greatest care that they do not grow high, putting the tree against a wall, allowing the branches to spread as vines would. This will protect everything within its limits, and also by reflecting the sun's rays give the trees greater warmth.

Instead of taking two separate spaces for garden vegetables and fruit, they make one do for both. It would be unusual to see a piece of ground allotted to blackberries, for land must be protected, and these are cultivated for hedges, serving as fences, and not wasting land. All wood they take the greatest care of. There are laws permitting underbrush to be cut once in two or three years, and laws for the cutting of limbs from forest trees. The former is used for light firewood, and the latter for large fires. This keeps the trees in fine order, there being no disagreeable branches to bother one in riding or walking, leaving them at the same time enough foliage and branches to provide the shade desired.

The Norman farmer could teach the American farmer a lesson in the transportation of produce. By driving tandem he makes two horses do the work of three. It is common, as it is necessary, in order to obtain water on the plateaus, to come to the valley for it, for it would be a queer French valley that was not drained by a river. The wash to these rivers makes the country fertile, but fertility is not their only mission, as they supply also many mills and factories.

KING PARK, Normandy, France.

The Mesa Lands of New Mexico.

Standing on the highest point in the San Andreas range, in Southern New Mexico, fully 5,000 feet above the level of the Rio Grande, one looks south into Texas and Old Mexico, east into Texas, west into Arizona, and in the north can be seen the high peaks about Santa Fé. With very little rain, constant sunshine and sand always dry and hot, one would expect a dearth of animal and vegetable life, yet such is not the case. One never recovers from his surprise that there should be so much life where apparently there is so little to support it. The heated sand is clothed with a scanty covering of a peculiar straw-colored grass called grama, which grows year by year without ever wholly becoming green, except near the ground. It is upon this that the antelope and cattle live, for, notwithstanding its dry appearance, it contains a certain amount of nourishment in the lower parts. Cactus is very common, and the yucca, or soap plant, with its thick stalks and crown of dagger-like leaves, rises on all sides, the only plant on this great mesa resembling a tree, and that only in having a trunk. The sap and fiber of the soap plant is strongly alkaline, and at the ranches pieces of this plant take the place of soap, the main objection to its use being that it is too strong unless used sparingly. In Mexico, and also in Texas, I believe, the industry of making soap from this weed is an important one. The woody fiber, after the extraction of the alkali, is woven by the Mexicans into an excellent rope. Of shrubs there is quite a variety, the mesquit and sage brush being the most common. Beneath the sagebrush and mesquit, burrow innumerable frisky lizards, clumsy horned toads, rattlesnakes, centipedes and tarantulas. The jack rabbit, cottontail rabbit, chipmunks and antelope; the

cowardly coyoté, always semi-translucent with hunger, and in places the prairie dog have their homes on these barren tracts of sand. Birds are comparatively scarce, the most common being the turkey buzzard, a species of hawk, the Mexican quail, the turtle dove, the chaparral cock, and an occasional eagle. The struggle for existence is a severe one, and the only wonder is that they do exist amid such discouraging circumstances. There are two great dangers constantly threatening the plants: one, long continued drouth, the other destruction by animals. The constant blaze of the sun upon the unprotected sand heats the ground to the depth of a number of feet, depriving it of every particle of moisture. An ordinary plant could not live under such conditions, and it is only by extensive modifications that those indigenous to this vast desert are able to survive. These modifications are in two directions, enlargement of roots, and decrease of surface open to evaporation. Thick foliage and large leaves are never seen among the mesa plants, but on the contrary, very small scattered leaves, sometimes thin, often long and thick, with as little surface as possible. The cactus species accomplish the double object of storing moisture and reduction of surface, by a modification and union of the leaves and stems. With the exception of the cactus, and one or two other plants, the storage of moisture is accomplished by the roots. The best example of this is the mesquit, which, even when the branches above ground are few and small, has immense roots spreading over considerable surface, and from the center sending a tap root deep into the ground. On the plains the mesquit is always small and stunted, but in the valleys, where there are veins of water in the subsoil within reach of the tap root, it often grows to be a good sized tree.

R. S. TARR, Taos Co., N. M.

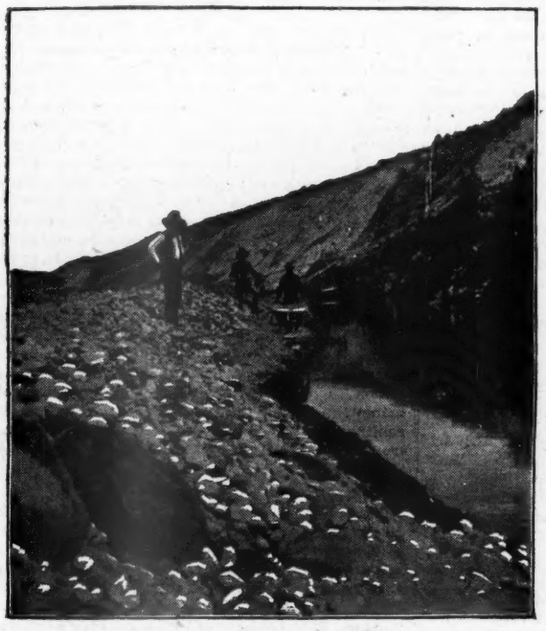


FIG. 1. KENNEWICK IRRIGATION CANAL.

Gardening on the Gulf of Mexico.

After ten years of experience on the Gulf coast, I have come to the conclusion that we have a good farming country. We can not raise as many bushels of corn, or potatoes to the acre as can be raised farther north, but we can grow the largest weight of cabbage, Irish potatoes, sweet potatoes, corn, or tomatoes during one year. Peas planted in January and February were sold and the ground planted with tomatoes. Cabbage planted January 15th were sold, and corn planted on the ground; and Irish potatoes planted in December and sold in March and April, then Golden Wax Bush beans planted, to be followed by sweet potatoes. Turnips planted in January were followed with squash, and that with corn or sorghum, or cowpeas for green manuring. We grow oats, rye, turnips, English rape, carrots and mangels—for stock feed during the winter. Carrots will produce 500 bushels per acre. We can cut oats twice or thrice the average height, being eighteen to thirty inches at each cutting. All heavy work is done during the cool winter months.

J. P. TEAS, Jefferson Co., Texas.

The Columbia and Yakima River Delta.

The delta at the confluence of the Columbia and Yakima rivers, which lies on the west side of the Columbia river, under the protection of the hills, to the southwest, comprises a territory of over 12,000 acres, much of which has been reclaimed and put under cultivation. This portion of Eastern Washington is probably the most favored as to climate and location of all the irrigated lands now coming into prominence in the Northwest. Though this region is the extension of the renowned Yakima Valley, and also Walla Walla Valley, its climate is milder and the seasons are earlier, because the lowest point in this valley is about one thousand feet lower than the upper Yakima valley, just above North Yakima. The elevation above sea level is the controlling influence in the climate of Eastern Washington. It is less than three hundred feet above the sea level at the lower end of the Kennewick Valley, opposite the mouth of the Walla Walla river, which causes the seasons in this section to be sharply defined; and, although only thirty miles west of Walla Walla, the orchards here develop two weeks earlier. Peaches were put on the market here, last year, two weeks earlier than those grown at North Yakima and Walla Walla. I was first attracted by the fruit exhibit, in 1890 at the Spokane exposition, in which the grapes, peaches, and other fruits, were unexcelled. These were grown on the same side of the Columbia river, where the soil is similar to the delta referred to. The Kennewick valley has exceptionally fine transportation facilities, as it extends along the Northern Pacific railway, and south to the Union Pacific railway, and the Wright system, which is now connecting these lands with the Chicago, Burlington & Quincy railway, the work of construction being nearly finished through the State of Washington, from the Columbia eastward. The market value of the irrigated land is $35 per acre in this second year of improvement. The Kennewick canal (Fig. 1) has water flowing through it from the head gate of the wing dam in the Yakima river (Fig. 2) over thirty miles, where it runs into the Columbia river.

A. B. ELY, Yakima Co., Wash.

Waste Lands of the South.

In considering the waste lands of the South, I do not wish to be understood as referring to the old fields which are universally considered as wornout, and consequently are thrown out of cultivation, but to the many thousands of acres that are under fence and allowed to grow up in a comparatively valueless sedge. They are unproductive, unprofitable and unsightly; yet the taxes are often just as high on an unremunerative crop of sedge as on the best cultivated acres on the farm. All land that is not producing a remunerative crop is a continual expense without a corresponding profit. These patches of sedge lie mostly either in the creek or river bottoms, or in what is known as second bottom. In either case they are free growing, productive soils. In almost every instance the forage and feed crops raised on these large farms are insufficient to meet the requirements of the stock and cattle that are kept on the place; as a consequence there is always a time when succulent feed is scarce. These patches of sedge should be turned under in the fall, then well and thoroughly harrowed. The dry creek bottoms should be seeded to red or white clover, blue grass, orchard, Italian rye, yellow oats, rough stalked meadow, sweet scented vernal, tall oat, hard fescue, meadow fescue and other grasses. The damper grounds should be planted with red top, reed canary, rough stalked meadow, fowl meadow, and tall fescue grasses with white clover. Any of these sown singly or as a mixture of all would furnish pasturage, or hay in abundance for all practical purposes, with some to spare for less provident neighbors. Thus work stock and cattle would be fat and sleek, and milk and butter plentiful. For those who do not desire to plant such a mixture, and need something that requires absolutely no care nor attention outside of the first sowing, I commend the Bermuda and Johnson grasses; the former for pasture and the latter for hay. Johnson grass, red top and orchard grass are the best three hay grasses throughout the South; while Bermuda, Kentucky and Texas blue grass are the best three pasture grasses. Red clover should always find a place in the hay field, and white clover in the pastures. Rye, barley, winter oats, vetches and scarlet clover should be annually sown in the crops of corn and cotton, as they in connection with both Kentucky and Texas blue grass will furnish grazing at all times through the winter when the ground is not covered with snow. While on the subject of crops for waste lands, I must not forget the burr clover, the cowpea and alfalfa, each and all pre-eminently adapted to the South. If we must practice the extensive as opposed to the intensive system of culture, by all means let the surplus acres be in grass. Keep the land occupied with a growing crop, but not with that which is unprofitable, such as the obnoxious broom sedge.

G. H. TURNER, La Fayette Co., Miss.

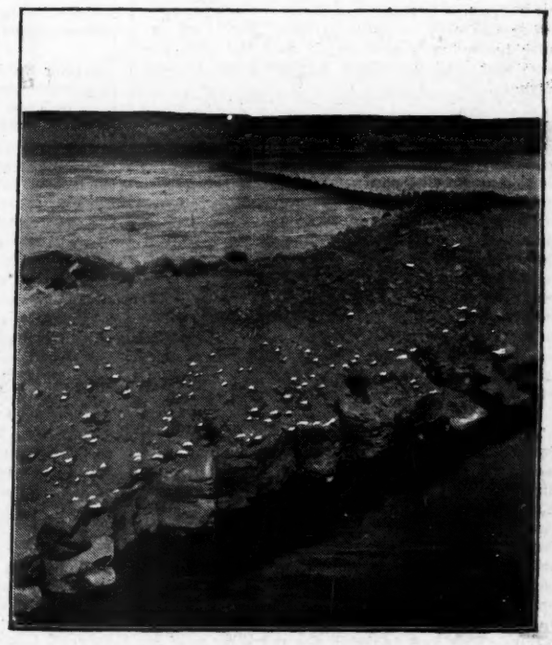


FIG. 2. WING DAM IN YAKIMA RIVER.

Rabbits in Wyoming.

A few miles from Laramie are the Red Hills, so-called because they are colored a bright red with oxide of iron. The Laramie Plains near these hills are a noted place for jackrabbits, *Lepus callolis*, and many hunting parties are organized to capture them. These long-eared rabbits are not found east of the Mississippi river, and might properly be termed Texan rabbits, though because the long ears resemble those of a donkey, this species is popularly known as jackrabbit. As they are larger, they can browse and girdle fruit and ornamental trees higher up than is possible with the smaller rabbits, and hence the ordinary tree protection must be extended in the regions where jackrabbits live.

ALBERT N. FINFROCK, Albany Co., Wyo.

Costly Dairy Apparatus.—A. R. Windecker, Cass Co., Ind.: Much fine butter finds its way to the market without the assistance of any patented apparatus, and tons more will follow. Good machinery alone cannot produce fine butter. It is understanding the requirements of the process under varying conditions, and not being afraid to do some work if needs be. On the whole, where a separator cannot be afforded, we think deep setting the best, but a pail eight inches in diameter and eighteen inches deep, if set in a plain board tank of ice water, will cream milk very well. The improved machines save work in various ways, but so good an authority as Prof. Babcock says that if the conditions of setting are equal, the cheaper creamer will often do as good work as the more expensive and highly-lauded machines.

Cows for Butter.—A. W. Decker, Cass Co., Ind.: None of the thoroughbred breeds of cows have the exclusive production of fine butter. What are known as common cows, if well selected and fed as they should be, will make butter in no way inferior to the best. The first premium has gone far more times to the skill of the man or woman who made it than the breed of cows. Seventy-five cent butter is more nearly a fad affected by the rich than a reward for any noticeable superiority of the butter. The skill in making, the dainty manner of putting it up, and the exact regularity of supplying the fastidious customer, are about the only difference. Some recent tests seem to show that the milk of a herd of mixed bloods, well fed and cared for, is the source of the finest flavored butter. Where the high bloods excel is in persistant milking and high grade of milk.

Paragon Chestnut.—W. Scott, Hamilton Co., O.: It is our opinion that the Paragon chestnut is a seedling of some foreign variety pure and simple with no trace of the native sweet chestnut about it. It possesses every characteristic of the European varieties, even to the bitter skin of the kernel. But we cannot see that this should make any difference to those who desire to or are cultivating this very valuable variety. The trees are quite hardy, very productive, and the nuts are large and will command a good price in our markets.

Farm Contrivances.—J. Whildin, Ottawa Co., Kansas: Inventions necessarily constructed on the farm, and not in constant use, or not conspicuous, may be easily infringed without detection, and if detected the patentee can claim damage for the manufacture and use of but the one article found. Hence it often does not pay to patent and defend such inventions, no matter how useful and ingenious they may be. Such inventions not generally being patented, no one has any special interest in advertising them. Persons inventing or knowing of such useful inventions or appliances not patented nor intended to be patented, may easily publish them in any agricultural journal which will gladly give the public the benefits.

The Foundation for a Dairy Herd.—J. G. Old, Portage Co., Ohio: A herd of well-selected common cows, which are strongly inclined to the dairy form, and long milkers, are an admirable foundation for a dairy herd. The experiments for the last three years, now confirmed by the Columbian Dairy Tests at Chicago, prove that cows are valued both for butter and cheese by the measure of butter fat in the milk. A cow, to be a good cheese producer, must first be a superior butter cow, so if one can combine the good flow of milk of the common cow, and increase the percentage of fat in it by breeding it in, using a sire of some notable butter-making family, there is no reason why the second and third generations of this cross should not be the best of cows for the well equipped dairy farm. Intensify this cross by retaining the first sire and crossing him upon his own get. Select the best of the heifer calves, and in due time use him again. To bring in a new sire each year is to diffuse to some extent the strong heredity of the first cross. Of this be sure, that you keep to the same blood. Do not mix thoroughbred breeds. The result is always a compromise. The common stock that we now have is the mixed blood of all breeds, and to grade them up one must use only one breed.

The Silo in Dairying.—A. R. Wind, Cass Co., Ind.: A silo at the start is not a matter of ruin or success to a dairy. The main point is that dairying nowadays must be an all-the-year-round industry, and there must be more abundant and cheaper foods for the cows than all pasture and meadow supplies. The great corn crop is the dairyman's mainstay, and no plan or system combines so many economies and advantages in harvesting and putting this great crop before the cows so cheaply as the silo. Certainly it does not pay and is a positive loss to husk and grind the corn and feed the meal back to the cows with the husked fodder. If the silo is to be ignored, then put the corn crop into the best built stooks possible, and when ready to feed run it through a cutter, cutting into half-inch lengths, moisten and sprinkle on some bran, and get a far better result than by the old way. A 100 ton silo in the barn should not cost over $75.

Winter Work for Farmers.—J. Weldon, Grant Co., Neb.: Do not compel swine to quench their thirst with brine or soap suds. Give them a full drink of water first, and then the brine or soap suds that they will drink ill' efit rather than injure them. Cut up the quarter of beef in suitable sizes for cooking before hanging it up to freeze. Late in the winter put another covering of coarse manure on the potato pit. This will keep it cool longer in the spring. If potatoes grow in the cellar rub off the sprouts often to keep them from wilting.

Diplomatic Hens.—G. A. Woolson, Rutland Co., Vt., writes us: "The 'thinking apparatus' of domestic fowls is usually underestimated if we may judge the mental caliber of the 'business hen' from a bit of manœuvring recently observed. A fox terrier became an expert in driving hens from a certain garden; indeed, so well acquainted were these hens with the name and capabilities of Sprite, that they often took to flight on hearing the name called. A change of tactics, however, is permissable among all bipeds. On one occasion the entire flock huddled behind a large tree, on seeing the dog approach, and sidled around it together; thus holding the field themselves by escaping the vigilant eyes of Sprite."

Saving Fuel.—John Peters, Sullivan Co., Ind.: In a stove that can be properly regulated a fire may be kept alive all night without consuming more than ten pounds of coal, and in the case of wood, fire may be found in the stove in the morning if knots or heavy pieces of wood be used and the stove tightly closed upon retiring. But one of the cheapest and greatest fuel savers is to have the room as nearly air-tight as possible, and to do this weather strips must be used at all the doors and windows, and if the doors are in an exposed situation, a closely fitting false or storm door should be used. If the building is an old one, it will pay to remove the siding and apply good building paper before the siding is replaced. It costs but little, and will save many dollars' worth of fuel and make the house more comfortable.

Grafting Pear Trees to Produce Fruitage.—Jud. Pierce, Mobile Co., Ala., writes us: "In view of Prof. James' conclusions in his article in the September number of the AMERICAN AGRICULTURIST, namely, that the majority of the cultivated varieties of pears and apples require cross-fertilization in order to bring about successful fruitage, I suggest that orchardists graft a few branches on each shy-bearing tree with some other suitable variety."

Best Time for Pruning Grapevines.—C. J. Otwald, Luzerne Co., Pa.: In sections where the Concord, Delaware, Catawba and other grapes are extensively grown there has been a radical change during the past fifteen years as to the time of pruning. Formerly this operation was delayed until as near spring as possible, usually having the work completed by the end of February, while now just as soon as the leaves fall the pruners are set to work in many vineyards, and not unfrequently before deep snow comes the work is completed. If the owner does not prune he employs some one thoroughly familiar with this work. He simply goes through the vineyard with a pair of shears severing the vines at the proper joints, and leaving them still clinging to the trellises, as cheaper labor can be employed to remove them at any time before the new growth commences in the spring. This early pruning divides the work and allows the end of the severed vine to thoroughly harden so that there is no danger from the sap oozing out, as is often the case with late pruning.

Hop Culture.—H. S. Weaver, Buckingham Co., Va.: The best hops are produced in Central New York, Middle Wisconsin and Oregon. Sometimes hops command less than ten cents per pound, at other seasons forty and even fifty cents are obtained for extra quality. They bear the second year after planting, but their culture and preparation for market are expensive operations, which require experienced labor at every stage to insure success. Good prices are obtained only when the production of foreign countries is below the average. We would not advise any one to engage in hop culture without having experience in it, unless he has the aid of a person who thoroughly understands the business in all its details. In a section where hops have never been extensively grown it would be best to set out but a few plants to begin with. Poles are a heavy item in fitting up a hop yard, and a building must be erected in which to dry and bleach the crop, presses obtained, and other incidentals incurred before you realize a penny on the outlay. The roots are usually planted as soon as the ground can be properly worked in the spring.

Separated Milk for Pigs.—A. Decker, Cass Co., Ind.: For dairy apparatus for twenty cows get a $100 separator and cream the milk as fast as milked. This is the best way of getting all the fats from the milk, and dispenses with all the intermediate work of butter making. The milk is then ready to feed sweet to the growing pigs, with an addition of a little oil meal, and a complement of corn meal. This gives the pig the best ration yet devised. The moment the pig weighs 140 to 150 pounds, sell it and put a younger one in its place. In this way one gets the growing weight of the pig, which is always more economical and profitable feeding than the finishing off process, if milk is to form one of the food elements. Milk is always the best food for a growing animal. The fattening animal needs grain.

Various Sources of Sugar.—The plant which supplies the most sugar for human use is the beet; next comes the sugar cane, and these two excel all others. The hard maple, however, produces a large quantity of very pleasant sugar. The soft maple and the box elder produce a whiter but a poorer sugar. There are many species of palms which yield a juice almost as rich as that of the tropical sugar cane, and much purer. Clarified sugar palm sap is as clear as spring water. The wild date palm produces the most sugar. Sugar has been made from watermelons, and even from the American field corn, but not profitably. Sorghum is a most promising sugar plant. It is, undoubtedly, the Northern sugar cane, and when better sugar producing varieties have been selected, the manufacture of sorghum sugar will certainly prove a large and profitable industry.

Hair and Oilcloth.—Reader, Minneapolis, Minn.: In the preparation of curled hair for stuffing sofas, cushions and mattresses, the hair is first carded by hand-cards which straighten, disentangle and clean it; this is then taken in bunches and spun into rope. The rope is then wound on a wheel and the coil steeped in water for three or four hours, and then dried in a hot oven. The ropes are then untwisted, the hair torn apart, and is then ready for use. The process for treating cotton cloth with linseed oil to make it waterproof, consists simply in applying pure boiled linseed oil to the garments, as few or many coats as required, and hang them up in a drying room until the oil is hard.

Bat Cave Guano.—T. W. Ressemann, Delaware Co., N. Y.: The fertilizing matter found in the bat caves of tropical countries is a form of guano, and its value depends very much upon its age and the varying conditions under which it has been deposited. Peruvian guano is the fæcal matter,

and bones, feathers and flesh of fish-eating birds which have frequented the islands along the west coast of South America for many ages, and where, owing to the very dry climate of those regions these deposits suffer very little from the action of the atmosphere. The rain which falls with us during one summer would probably wash away all the great guano deposits of South America. A similar guano is found in limited quantities in caves frequented by bats, but it is rarely plentiful enough to attract much attention, but it is only in warm, dry climates that bats are abundant enough to leave any considerable amount of excrement in their lodging places, whether it be in a garret or cave.

Geranium Worms.—W. D. Rogers, Essex Co., Mass.: The green worm about one inch long, which you find feeding on geranium leaves, is very much like the common cabbage caterpillar (*Pieris rapæ*), but we have never known the latter to attack the geranium. We cannot give you the name of this geranium pest until we secure a specimen of the insect in its perfect or winged stage. Dusting the plant with Persian insect powder would probably destroy the pest, but we wish you would feed a number of the caterpillars until they pass into the pupa stage and then forward them to us by mail. They may be confined in a glass jar and given a few fresh leaves daily until they change, which will probably occur within a week or ten days.

Pecans in New England.—Peter Brocks, Hartford Co., Conn.: It is very probable that the pecan tree will grow and thrive in the climate of Connecticut, provided the trees were raised from nuts produced by trees native of Missouri, Illinois, or other Northern States. But should you plant nuts obtained in the markets, and that came from the Gulf States, the seedling would very likely prove tender in Connecticut. Seedlings of the Meyer pecan, a native of Northern Missouri, have for the past three years withstood a temperature as low as you get in Connecticut, without the loss of a bud, although during one night last winter they were subjected to a temperature of 20° below zero. But we do not know of any one having trees of this variety for sale, and we think the nuts from the original tree are all reserved for planting. Write to the nurserymen whose addresses you may find in the AMERICAN AGRICULTURIST, for information in regard to hardy pecan nut trees.

A Weed from Maine.—John Rankin, Washington Co., Me.: We are inclined to think that the three small leaves you send are those of some species of crowfoot (*Ranunculus*), but we cannot be certain of it without the flowers to aid us in identification. Applying manure or any form of fertilizer to your lawn would not destroy this weed and if you turned it under with a spade the roots or seeds might grow again. If you do not want to disturb your lawn by spading or plowing it, try digging out the weeds with a garden trowel, or killing them by putting a drop or two of sulphuric acid on the crown of each plant. If used with caution the acid will not injure the surrounding grass roots, but it will kill those of the weed.

Potatoes Under Straw.—S. Brown, Erie Co., Pa.: Dropping seed potatoes on the surface of good soil and then covering them with straw is not, as some persons have claimed of late, a new mode of cultivation, but really an old one described in books published in this country more than a hundred years ago. In a Farmers' Dictionary, published at Worcester, Mass., in 1790, we find the following on this subject: "The method of raising potatoes under straw is very simple and easy. Lay the sets about eight inches apart each way, on any kind of soil that is not too rich. Cover them with straw or refuse hay to the depth of about twelve inches. Nothing more is to be done to them till they are taken up. They will be very clean and the crop considerable."

The Elm-Leaf Beetle.—D. Raymond, Bergen Co., N. J.: The dead and burned appearance of the foliage of your elm trees during the summer was due to the depredations of the imported elm-leaf beetle (*Galeruca xanthomelæna*). When this pest was first observed in this country it attacked only the European elms planted in the public parks and private grounds, but in time this insect seemed to gradually acquire a taste for the leaves of the American elms, and now we find it almost everywhere defoliating elms of every species and variety, even invading the forest in its search for food. This insect can be poisoned with Paris green when within reach, but when it takes to some old giant elms from fifty to a hundred feet in height it is practically out of reach and we may as well give up the fight and allow this great pest of the elm to pursue its course undisturbed. Unless some natural enemy of this insect soon appears to destroy it, we fear that our elm trees must soon disappear, except perhaps in some of the larger forests.

Chestnut Weevils.—L. Fancher, Henry Co., Ky.: The native nut-weevils, which breed in the indigenous chestnut will also attack any and all of the foreign species and varieties when grown in this country. We have found this weevil fully as destructive to French and Italian chestnuts as it is to the American varieties. Perhaps when chestnut orchards have become established here and nut-culture has assumed some importance as an industry, cultivators will probably make an effort to check the increase as well as depredations of the various species of nut-weevils, as has long been practiced in European countries. It takes a long time to enlighten the human race on any subject, and when even a few persons have learned just what they ought to do, their natural stubbornness or indolence prevents the doing.

Nightsoil.—J. M. Burkhead, Cabarrus Co., N. C.: Nightsoil varies greatly in value, as gathered from vaults in country villages, because some families throw a great amount of rubbish into such receptacles. When to be obtained free from broken crockery, tin cans and similar articles, it is probably worth gathering and hauling a mile, which is the distance you name. When hauled home it should be immediately composted with dry muck from the swamps, or good, rich loam; and be careful to make the compost heap at some distance from your dwelling and from the well, and where drainage from the heap will not be washed into any stream or pond. For every load of the nightsoil use one load of the dry loam or muck, and always finish the heap with a layer of the latter to prevent the escape of the volatile gases. We recommend composting the nightsoil, because it is the most readily disposed of in this way without giving offence to your neighbors, besides the dry earth used with it will quickly absorb the liquid and act as a deodorizer, and then, after the heap is turned over once or twice, the manure is ready for use upon almost any kind of crop.

Killing Milkweed.—J. B. Wood, Worcester Co., Mass.: Any and all kinds of noxious weeds, including the milkweed, may be killed out by contantly cutting off the stems and leaves in summer, or by tearing up their roots with plow and harrow. But if you do not care to practice either of these modes of destruction, then we advise mowing down the milkweed in August, then place one or two drops of sulphuric acid on or in the hollow of the freshly severed stem. A man with a wide mouth bottle or common pint fruit jar, with a wire bail for carrying it, and a stick or glass rod as a dropper, will be able to go over quite a large patch of weeds in a day giving each a dose of acid. We have found this to be the cheapest and most rapid way of getting rid of plantain, mulleins, and other coarse weeds in a lawn, the dead roots soon decay and become nutriment for the grass. The acid can be purchased for five or ten cents a pint or pound, and if used with care and as directed, the lawn will not suffer as the weeds disappear.

Woolen Dust—Apples Rotting.—William Houson, Middlesex Co., Mass.: Woolen dust or waste from the woolen mills is an excellent fertilizer although the shreds of wool in it may decompose very slowly in the soil. Pure wool contains about fifty per cent. of carbon and twelve to eighteen per cent. of nitrogen besides sulphur and a small amount of lime, soda and magnesia. The waste to which you refer should give excellent results for several years if applied in liberal amounts, and thoroughly stirred in with plow and harrow. We presume that red Astrachan apples are destroyed by either the common codlin moth or some species of curculio, but we cannot decide positively without knowing more about their condition, when they drop from the tree. If you find worms in them then you may attribute the dropping to insects, if not, then it may be caused by some fungus attacking the fruit. Spraying the trees in spring as soon as the fruit is fairly set will destroy the larvæ of the apple moth, and sulphate of copper solution is best for destroying most species of fungus, but the application should always be made early in spring, and repeated every two or three weeks during the early part of summer.

Hydraulic Cement.—H. E. G., Pottawattamie Co., Iowa: Hydraulic cement and water lime are one and the same article. In building a concrete walk it is best to use water lime for that part under ground, because common lime is likely to be affected by moisture, and the foundation might give away and cause the concrete above to crack.

A Plow for Digging Drains Wanted.—Henry Stewart, Macon Co., N. C. writes us: What is to hinder the implement makers from making a plow for digging drains, in this way: The point is narrow with a narrow double share. On each side of the share is a hollow, smooth steel moldboard made like a scoop that takes the furrow slice cut from the land, guides it by a suitable curve and delivers it on each side of the ditch. The share should be long so as to take a steady bearing on the ground and keep the bottom of the ditch level. With some such implement as this the greater part of the work may be done for three cents a rod, leaving only a little finishing to be done by hand to fit the bottom for the tiles. The covering may be done by an ordinary plow. Such an implement would reduce the cost of draining land one-half, and greatly help to extend this most desirable and profitable work.

A Preventive of Tomato Rot.—J. O. Carey, Genesee Co., N. Y.: The only substance which has been found effective in preventing and remedying tomato rot is the Bordeaux mixture with which the plants are to be sprayed before the rot has made its appearance. As a rule it is less in plants which are trained to stakes or trellises than those which trail directly upon the ground.

Climbers for West Windows.—P. S. R., Brooklyn, N. Y.: One of the best vines for this purpose is the *Cobæa scandens*; it will thrive where there is but little light, is a rampant grower, and will flower the whole winter. It is, moreover, free from all insect pests. The German ivy (*Senecio mikanoides*), does remarkably well in partial shade; with light wire netting for a support, it quickly forms a beautiful screen. The only objection is that it is liable to attacks of the green fly.

How to Have Apple Blossoms in Winter.—S. M. B., Cincinnati, O.: Take flowering branches from the trees, not earlier than the middle of January, put them in water, in a tall vase, and give them a sunny place in a warm room. Lilacs can be brought into bloom if treated the same way.

Roses as House Plants.—Peter Felix, Essex Co., N. J.: Our advice would be, never to try to grow roses in the dwelling house, as it is not the place for them. It is warring against nature, and all such attempts are disastrous. You may occasionally get a poor, sickly flower, and you will get myriads of green fly as well. The place for roses is in the garden, or in a house built expressly for them. When there are so many plants that will ornament the living room, it is unwise to introduce those that disfigure it.

Lilies.—J. E. F., Boston, Mass.: If you want your lilies to continue to do well, as they now seem to be doing, let them severely alone. Never disturb a clump of lilies so long as it blooms satisfactory. No plant suffers by a change so much, none other needs one so little. Cover the bed with coarse manure soon after the first hard frost; carefully rake it off as soon as the bulbs commence growing in spring, and remove the small bulbs that form on the top of the old bulb and plant out for future use; then, replace the mulching, to keep the ground cool in summer. This is all the care a lily bed requires for years, but this it should have annually.

Soil for Heliotropes.—M. Miller, Rutland Co., Vt.: A good, heavy loam, made rich with well-rotted manure from the cow stable, is best for most house plants. For the conservatory, grow heliotropes as standards, and keep their branches well cut in so as to form bushy, compact heads. They should be kept cool and moist and vigorous.

SCIENCE IN FARMING.

Forest Planting on the Prairies.—Experiments in growing forest trees at the Illinois station are reported by T. J. Burrill and G. W. McCluer (B.26) as unfavorable to growing timber in the Mississippi valley as a profitable farm crop on land fit for wheat and corn. As long as good bituminous coal can be had at present prices, it will not pay to grow wood for fuel, except on farms for home use. Throughout the Mississippi valley, though the extent of the natural forests has been diminished, the price of cord wood does not advance. Lands covered with tree growth, even though well timbered, sell at a less price per acre than adjoining lands of the same quality that have been cleared or than prairie lands of the same productiveness. The value of the timber in such places is less than the cost of clearing and bringing under cultivation. It must, however, be recognized that the value of natural forests gives little information as to the worth of artificial plantations. The former may be mainly composed of what is in the locality most prized, but usually only a small proportion of the trees are those commanding the highest price. In the artificial plantation, judiciously managed, the whole may be high priced, useful material; this, too, may be more readily accessible, within easy reach of the market, and be grown on land unfit for ordinary farm crops, as it is in Europe. While it must be insisted that the figures presented by theorists as to the value of timber as a crop are very often extravagant and by no means a proper basis for business, yet tree-planting for the many and varied purposes of health, comfort and pleasure, with financial profit as a subordinate factor, should be studied and practiced by individuals, communities and nations.

Insects Injurious to Stored Grain.—Stored grain and seeds of all kinds should be frequently examined for insect attacks in order that their depredations may be stopped before serious loss occurs. According to M. H. Beckwith, of the Delaware station (B. 21), the first indication of insect attack is a marked increase of temperature in the mass of grain as though it had become damp from some cause and fermentation had commenced. These grain insects breed and are most active during warm weather, and there is little danger of their injuring grain or seeds during the winter, except those stored in heated rooms. All four forms of insect life, the egg, the larva, the pupa, and the adult insect are destroyed when subjected to the fumes of bi-sulphide of carbon. The bin or the granary should be made practically air tight, or at least there should be no drafts of air when the bisulphide of carbon is applied. This volatile chemical evaporates rapidly, and the fumes being heavier than air, they will sink through the grain, so that it is not necessary to place the liquid beneath the grain, though it is better to spread the grain in as thin a layer as possible. The bisulphide of carbon is highly inflammable and no lights or fire of any kind should be allowed in or near the buildings in which it is used for at least a day after its use, and not before all smell of the substance has disappeared. The expense for the chemical will be about one-half cent per bushel of grain treated, at the rate of one-half to one ounce of bisulphide of carbon to each bushel of the infested grain.

Shrinkage of Wool.—To determine the loss occasioned by shrinkage in handling and holding wool under varying conditions, C. F. Curtiss, at the Iowa station (B. 21), stored by three different methods, twenty-four high grade Shropshire fleeces, divided into four lots. One lot consisting of five fleeces was weighed, fleeces separately, and packed in a dry, clean box just large enough to contain the wool conveniently, and a close fitting cover nailed on. Another lot containing light fleeces was weighed in the same manner, and was sacked and suspended from the ceiling. A third lot of five fleeces was placed on a shelf and closely covered, so as to exclude all dust and prevent disturbance. These three lots of fleeces were clipped between the 14th and 18th of April. The fourth lot containing six fleeces was sheared about June 15th, and was weighed, sacked and placed under the same conditions as the second lot on the 24th of June. All of the wool was stored in the same room, a dry, well ventilated sheep barn, and exposed to a free circulation of air. On June 15th of the next year, all the fleeces were weighed separately. There was practically no change of weight in the first three lots of wool sheared in April. The June clipped wool, however, showed a loss during the year of about six per cent. of the original weight, and as the first weight was not taken until a week after shearing, there may have been an additional loss that was not determined. The experiment indicates that April clipped medium wool from a well kept flock, free from dirt and stored in good quarters, will not shrink in weight to any appreciable extent within a year from the date of shearing. June clipped wool, of substantially the same grade, will, under the same treatment, shrink about six per cent. of its original weight within a year.

Heat for Forcing Houses.—Experiments in heating greenhouses at the New York Cornell University station by L. H. Bailey and F. W. Card (B. 55), under conditions which placed steam at a disadvantage, nevertheless proved that steam is the equal of hot water. There was practically no difference in coal consumption under the two systems, though the hot water maintained a slightly greater average difference between the minimum inside and outside night temperatures than the steam did. In small houses the variations in temperature under either system is much greater than in larger outfits. The utility of slight pressure in enabling steam to overcome unfavorable conditions was fully demonstrated. The addition of crooks and angles is decidedly disadvantageous to the circulation of hot water and of steam without pressure, but the effect is scarcely perceptible with steam under even a low pressure. Circulation commences sooner with hot water than with steam, when starting a new fire with cold water, but it requires a much longer time for the water to reach a point where the temperature of the house will be materially affected than for the steam to reach a heating temperature. The length of pipe to be traversed is a much more important consideration with water than with steam. A satisfactory fall toward the boiler is of much greater importance with steam than any other feature of the distribution of the pipes.

Cutting Corn Fodder.—The grain is the most valuable part of the corn crop for the Mississippi Valley farmer, but the fodder also contains much stock food. D. A. Kent and G. E. Patrick, of the Iowa station, report (B. 21) that chemical analysis shows that the maize plant first elaborates plant food, and then uses it largely in forming the grain. The ripening of the ear results in considerable loss of the nutrient matter in stalk and blade, the loss being about twelve per cent. on field weight, and seventeen per cent. on dry matter, with a probable increase of loss in very wet weather. The experiments showed that ordinary field corn did best if cut and shocked late in September and early in October. The time to commence cutting corn is when the blades and husks have begun to dry, and all should be cut by the time that half the blades and husks have dried up. This gives about ten days for cutting corn; but the fodder is even better if the grain ripens so fast that the harvest would last but five days instead of ten. The great value of the fodder, the importance of having the ears as ripe as possible, and the large size of the prairie cornfields call for a machine that will harvest the corn crop with the same facility that the self-binder harvests the smaller grain.

Feeding Steers.—The fat steer that will bring the highest market price is the one that will give the largest proportion of meat in choice loins and ribs. This is shown by the results of feeding experiments at the Iowa station by J. Wilson and C. F. Curtiss (B. 20). Eighteen steers were bought in July and grazed together until winter. They had corn fodder on a winter blue grass woods pasture, with access to open sheds until the middle of February, when they were tied up in the barn and prepared for the trial for two weeks before the experiment began. The latter covered three periods of 92 days or three months each. During the first period, from March 1st to May 31st, with stall feeding, the average gain per day for each steer was nearly two and a half pounds at a cost of nearly six cents per pound. During the second period, June 16th to September 15th, nine of the steers, on red clover pasture and corn meal, gained an average of nearly two and one-third pounds per day at a cost of nearly four and one-third cents per pound; while the other nine steers on red clover pasture and linseed meal gained over two pounds per day at a cost of over six and one-fifth cents per pound. During the third period, from October 1st to December 31st, all the steers were fed in open yards, on both corn and linseed meal, with hay, corn fodder and mangels. The nine steers, from the summer corn meal, gained over three and one-fourth pounds per day at a cost of nearly six cents per pound. The nine steers, from the summer linseed meal, gained two and four-fifths pounds per day at a cost of nearly six and two-fifths cents per pound. The steers were Shorthorn, Red Polled, Hereford, Holstein, Galloway, Angus, Swiss, Devon and Jersey, two of each breed. The lot sold in Chicago for an average of six cents per pound live weight. At the slaughter test the eighteen cattle dressed nearly two-thirds of their live weight, while twelve head of the beef breeds dressed over two-thirds. Over 27 per cent. of the carcasses were the choice ribs and loins, selling at wholesale for eighteen cents per pound, and netting three-fifths of the total value of the beef. The Herefords brought the highest price per pound, followed by the Shorthorns, the Galloways and Angus, the Red Polled, the Swiss, and the Devon. The profitable killing steer should have a liberal amount of fat marbled with the lean, and not an excess deposited about the internal organs. The carcasses of the dairy breeds lacked in this and in the thickness of cuts. Steers must gain rapidly to enter the highest selling class, and a great deal of poor beef is put on the market at a loss when it would bring a profit if finished in the right manner.

Keeping Males with Poultry.—Whether hens will lay well when kept away from males has been a subject for experiment at the New York State station. As reported by P. Collier (B. 57), a pen of eight pullets kept without a male produced eggs at about thirty per cent. less cost than an exactly similar pen with which a cockerel was kept. Another pen without a male gave during the first three months about the same proportionate excess of product over an exactly similar pen with which a cockerel was kept. Then the feather eating habit developed and the egg product diminished, but during eight months the total egg yields for each pen was very nearly alike. In each of the two pens without male birds, some pullets had begun to lay from one to two months earlier than any in the corresponding pens where male birds were kept. The feather eating usually appears after feeding for any length of time an unvaried ration deficient in some constituents, more especially nitrogenous matter, but the habit has developed from idleness among fowls having a ration which gave satisfactory results with other similar pens of fowls fed at the same time. The vice should be stamped out by the removal of the first offender. The somewhat close confinement necessary in any trial where a careful account of the food is kept, will always make the conditions more or less unfavorable to the largest egg production. In these experiments no attempt was made to force the laying, and the broody fowls were allowed to sit at will, there being many nest boxes in each pen. About the same number became broody in pens having male birds as in those without. The trials show that where the eggs are not used for hatching, it is neither necessary nor economical to keep a male bird with laying hens for egg production.

Rations for Feeding Horses.—The proper feeding of horses is a very important operation to the farmer. E. M. Shelton, of the Australian station at Brisbane, reports (B. 24) the experiment of a transfer company, as to the practical results of the value of cut hay in comparison with uncut. In the experiment, three thousand horses were fed a daily ration consisting of sixteen pounds of ground oats, and seven and one-half pounds of cut straw. A second lot of three thousand horses were fed nineteen pounds of oats not ground, and thirteen pounds of hay not cut. It was found that the horses which ate the twenty-six pounds of ground oats and cut straw and cut hay, kept in equal condition and did the same work as those that had thirty-two pounds of uncut hay and whole grain. It was calculated that the gain for six thousand horses, using cut feed, would have amounted to five cents per day for each horse, or $300 per day for the entire stable. In these large stables every detail was scientifically and systematically performed, and the most careful economy practiced. In ordinary practice, the cost of cutting the hay and grinding the grain would be much greater, and necessarily the individual gain would thereby be much lessened.

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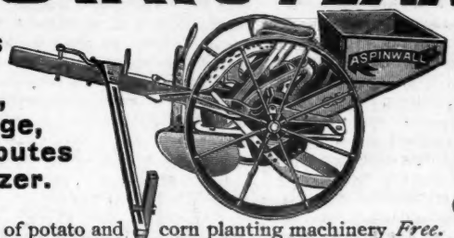

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FARMING IN FOREIGN LANDS.

Dorset Horn sheep are being quite largely introduced into Scotland.

Farmers near Montreal have been reaping good profits from their hay, cheese and butter.

The currant crop of Greece was greatly damaged this year by heavy rains at the time the fruit was drying.

A company has been organized in Capetown, South Africa, with a capital of $200,000 for making beet root sugar. The factory is to be at Worcester.

Arbor day has become an established institution in Australia, and has received the official recognition of the governments of some of the colonies.

Coöperative dairying is increasing largely in New Zealand. New creameries and factories are reported at frequent intervals in various parts of the islands.

The Orpington breed of fowls seems likely to achieve permanent success. It has been introduced from England into Australia, where it has become quite popular.

New South Wales, which is the largest wool producing colony of Australasia is introducing Lincoln and other long-wooled rams with a view to developing a trade in frozen mutton.

Coffee culture is being encouraged in Mexico, Central America and the United States of Columbia, but new plantations have not yet reached a point where they are able to sell exports equal to Brazil.

Foreign papers speak highly of a new French variety of potato, the Giant Sans Pareille. It is of great size—the tubers sometimes weighing two and a half pounds—very productive and of excellent flavor.

The viceregal government of India, aided by the local governments, is seriously considering means for the improvement of Indian agriculture. A conference on this subject was recently held in Simla.

A farmer of County Wexford, Ireland, recently died from the effects of contact with animals suffering from anthrax on his farm. A man in his employ was, at last accounts, hopelessly ill from the same cause, malignant pustule.

The business of exporting frozen mutton from New Zealand to Great Britain has not proved very profitable this year. The prices of sheep in the colony have been too high to permit of a profit upon the export of mutton.

Efforts have been made recently, with some success, to acclimatise horses in the new Belgian settlements on the Congo, in Africa. Belgian and Spanish mares taken there have dropped foals which are vigorous and healthy.

At a sale of the Queen's surplus Jerseys from the famous herd on the Prince Consort's farm in Windsor Park, fifteen head were sold. The prices were low, the highest being seventeen and a half guineas for a two-year-old heifer.

Butter making in Finland, under the fostering care of the government, has increased to such an extent as to bring about overproduction. It is now proposed to restrict the production of butter, and make a portion of the milk into cheese.

While England and Australia have been parched with drouths, some parts of India have been flooded by excessive rains. In the districts north of Calcutta the tea plantations were greatly damaged, roads rendered impassable and bridges carried away.

All parts of Great Britain, but more especially the south and southeast of England, suffered from heavy and long continued drouth. Pastures, meadows and root crops have proved almost a failure, and all farm crops were greatly reduced by the want of rain.

The Royal Institute for fruit and vine culture at Geisenheim, Germany, has made very successful use of copperas as a stimulant for plants that lack proper green color in their leaves. The sulphate is dissolved in water and applied near the roots, preferably in early spring.

A new society has been formed in London, for the purpose of getting back to the land some of the people who are starving in the towns. The English Land Colonization Society is the name that has been given to it, and its specific object is to assist the formation of farm settlements upon suitable property, and to work training farms in connection therewith for casual laborers of the unskilled or partially skilled class, agricultural laborers out of employ, or those who have small capital but whom rural changes have rendered unable to maintain themselves as village traders or artisans.

The unprecedented drouth in the south of England had its duplicate in the Antipodes. In New South Wales the pastures suffered so severely for lack of moisture that sheep were offered for nothing, but no one would take them, and many were slaughtered for their skins.

The Federal Assembly of the Swiss Confederation has issued a decree prolonging the concession of a drawback on sugar contained in condensed milk exported. In order to be entitled to the drawback, the milk must be exclusively of Swiss production, though the sugar is imported.

A prize has been awarded in France for a good method of preserving potatoes. It consists of plunging the tubers in water containing one and one-half to two per cent. of sulphuric acid. The strength of the bath and the duration of immersion are according to the thickness of the skins.

Russia has adopted very liberal measures to promote agriculture in Merv, its latest Central Asian acquisition. A new dam for irrigating purposes is to be built on the Murghab, and 500,000 roubles ($250,000) have been appropriated for the purpose. Cotton culture has increased tenfold.

Flax, grown for its fiber alone, in Ireland, costs about $50 an acre for both cultivation and preparation. Irish flax growers pull their crops before the seed is formed, to obtain a better quality of fiber. It is proposed now to sacrifice something of the value of the fiber, by allowing the seed to mature.

The district of Dacca, in the Province of Bengal, India, has an agricultural class which comprises nearly sixty per cent. of the total population. The methods there are of the most antiquated types. In fact, the aversion to labor-saving utensils and methods is quite natural in such overcrowded communities.

Grape growing is an important part of the agriculture of Cape Colony, South Africa, the product being made into wine and brandy. The amount for the present year was 6,110,617 gallons of wine, 1,516,835 gallons of brandy, and 366,341 gallons of spirits, the whole valued at over a million and a half of dollars.

The area devoted to the cultivation of indigo in the Northwest provinces of India this year was nearly that of last year. The prices obtained for last year's crop were the principal stimulant to increased planting this year. The total area this year was 239,222 acres, of which 234,433 acres were irrigated from canals.

Marrem grass (*Psamma arenaria*), which was introduced into the colony of Victoria, Australia, by the government botanist, has proved very valuable in holding shifting sands. It is practically indestructible, burning, cutting or feeding off seeming to make it thrive, while it propagates freely in exposed, shifting sands.

A milk war broke out recently between the farmers in the vicinity of the Alsatian town of Rappoltsweiler and the housewives of the town, over the price of milk. The farmers demanded 23 pfennige (about five cents) per quart, while the housewives refused to pay more than 11 pfennige. Each side was holding out, at last advices.

The secretary of the Irish branch of the Coöperative Union recently stated some interesting facts as to the success of the coöperative creameries established during the last few years in Ireland. Twenty-three out of twenty-five of these institutions at work last year produced 910 tons of butter, although some of them were in operation for only part of the season.

The Russian government has issued new regulations concerning the manufacture and sale of margarine and all artificial substitutes for butter. Special inspectors, who have received technical and medical education, will visit these establishments and analyze the products, with authority to impose fines or close the works for infringement of the regulations.

The famous Guisachan herd of Aberdeen-Angus cattle, belonging to Lord Tweedmouth, has been sold and dispersed. The Earl of Aberdeen, who is a son-in-law of Lord Tweedmouth, was one of the principal buyers. Several years ago Mr. Coutts Marjoribanks, a younger son of Lord Tweedmouth, brought a draft from the Guisachan herd to the United States, and settled with them on a ranch in North Dakota.

Successful trials have been made by a Scottish farmer in feeding barley dust to cattle. The dust is a by-product in the manufacture of pot and pearl barley, and has long been used for feeding swine. But now the enterprising farmer referred to has proved its value as a cattle food. He gives his fattening stock twenty-eight pounds per head daily of the barley dust, with oat straw.

Range grazing in South Australia has met with even more serious reverses than on the plains of the United States, and large herds have been disposed of at great sacrifices. The rapid settling up of the country, raising the value of grazing land, is the principal cause of the reverses, added to which are the depredations of rabbits, which ruin the grazing, and gangs of wild dogs which destroy the lambs.

Flax culture is receiving special attention in Manitoba. A few months ago a special commissioner was sent across the Atlantic to learn how flax is grown, dressed and manufactured in Europe. He visited Ireland for this purpose, and then was directed to extend his inquiries to Belgium and other places on the continent. The soil and climate of Manitoba are said to be eminently suitable for the growing of flax.

There is a strong movement in England for the abolition of check reins, or, as they are called there, bearing reins on working horses. The Hampstead and Highgate Anti-Bearing Rein Association has this for its object, and has accomplished much good work already. The railway companies, carriers, great brewers and large coal companies have abandoned the use of the bearing reins on all horses under their control.

A recent report on mule breeding in Yunnan, just beyond the frontier of Burmah, states that the business is carried on to a very large extent. There are hundreds of breeding studs with as many as 3,000 animals in some of them. The larger mules are sold to the Chinese, some for as much as $250, while the smaller ones sell for prices down to one-tenth of that sum. They are used principally as pack animals, the transport business of the country depending largely upon them.

The Egyptian government has appointed a commission to promote improvement in horse breeding. Pure breed Arab stallions have been purchased and stationed in various districts. Horse shows have been held in these districts, and a large number of certificates have been delivered to the owners of such mares as were considered by the commissioners to be sufficiently sound and promising, entitling them to the use of the government stallion stationed in their district.

An Australian farmer has adopted a very peculiar method of making silage. Having eight acres of maize or corn, which yielded a heavy crop, he laid the entire stalks, uncut, in three stacks, taking care to lay them all one way without crossing. Then he weighted the stacks down with logs and stones. When it had settled he covered the whole with earth two feet deep raised to a crown on top, which he thatched with cornstalks. The silage came out in good condition and was greedily eaten by the cattle.

The French Minister of Agriculture, disregarding the many applications which have been made for an alteration in the arrangement of the coming agricultural show in Paris, has decided that there shall not be a division of the breeding and fat stock sections, and the two separate shows, as they in effect are, will be held in the last week of January. The implements will be on view in the grounds of the Palais de l'Industrie from Monday, the 22nd, but the judging will not commence until Saturday, the 29th, the whole show remaining open until Wednesday, the 31st of January.

A lecturer at a meeting of an English Agricultural Workers' Union gave the figures in detail which show how an agricultural laborer supported his family of self, wife and five children on his wages of 11 shillings ($2.75) per week. The weekly purchases consisted of six gallons of bread, half a gallon of flour, half a pound of tea, a pound and a half of bacon, one pound of butter and cheese, three pounds of sugar, with oil, coal, soda, and six cents' worth of tobacco. Nothing was allowed in the estimate for shoes or clothing, and except at Whitsuntide they never had any fresh meat. The position of this family was that of thousands of other workmen throughout England.

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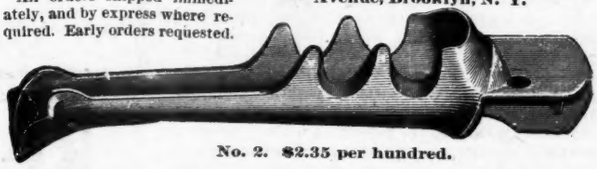

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In the Collective Agricultural College Exhibit at the World's Columbian Exposition the next division in size to that of Agriculture and situated directly across an aisle, was assigned to Mechanic Arts and Engineering, including Electricity. This was arranged on the same general plan as the Agricultural Exhibits. But here the exhibit was rather of the results of instruction than of the facilities therefor, being mainly examples of the handiwork of students, in wood and metal, the products of shop practice. The specimens contributed, however, were systematically arranged so as to show the progressive exercises and thus indicate methods of instruction. There were collections in carpentry, joinery, turning, pattern-making, casting, forging, chipping and filing, and tool and machine work of high grade from Alabama, Indiana, Kentucky, Maine, Massachusetts, Mississippi, Pennsylvania, Utah and Vermont. These specimens were, in some cases, accompanied by working drawings and blue-prints for use in the shops and showing the course of instruction.

Kentucky sent a complete set of patterns for a Corliss engine, and parts of the machine; Indiana, patterns for two forms of turning lathe, hand and power, and the lathes themselves, handsomely finished, ready for use; Massachusetts, patterns and parts of a steam pump for mining purposes, and the pump complete. All these were the work of students. The contribution from Purdue University, Indiana, was particularly large, complete and well arranged. The Massachusetts Institute of Technology added to its shopwork, a number of large pictures of the interiors of its shops and the elaborate equipment of its engineering departments; also manuals and books of reference for the use of students in mechanics, with albums of photographs and drawings. Mississippi sent a large model of the buildings for the mechanic arts department of her college, which stood on a table by itself, surrounded by samples of shop practice. An article of interest to many was a complete cotton-gin of small size, built for purposes of instruction and experiment, and loaned from Louisiana.

Electrical engineering, as taught at the colleges, was well illustrated by a fine dynamo built by Tennessee students, electric motors complete by California students, and designs for wiring a large building for lighting, by students in Pennsylvania. It was originally intended to have this division or alcove provided with electric lights put in place by students, and to use the dynamo and motors mentioned in operating the lathes and cotton-gin. This project was defeated by the selfishness and unreasonable requirements of the company having the electrical "concession" of the Exposition, or, in other words, monopolizing electricity in Jackson Park. Mechanical and engineering drawings by students, some of them handsomely finished and framed, were shown by Alabama, Kentucky, Massachusetts and Rhode Island (Brown University). North of the last described division and adjoining it were two alcoves about eighteen feet square, assigned to Civil Engineering and to Domestic and Fine Arts.

The Civil Engineering exhibit was largely of drawings, but there was also a complete set of engineering and drawing instruments and supplies, loaned by Maine, New York, Ohio and Oklahoma. The drawings were numerous and varied in subject, including elementary exercises, simple mechanical designs, land surveys, topography, plans for water-works, drainage, bridges, roof-trusses and architectural designs, some very elaborate. These drawings were from Alabama, Kentucky, Massachusetts, Rhode Island and Utah, and they showed the very practical character of the instruction given in lines indicated.

A number of the land-grant colleges admit women on an entire equality with men, and some of them have distinct female departments with special courses of study. The material contributed to the alcove of Domestic and Fine Arts, was largely the work of women, as might be expected. The articles were collected and arranged by Mrs. Nellie S. Kedzie, professor of household economy in the Kansas State Agricultural College, and formed a very attractive feature of the exhibit, which visitors thoroughly appreciated. Needlework was shown in great variety, plain and ornamental, and there were samples of all sorts of cookery which will "keep," with pickles, preserves and sweetmeats. There were pieces of

(*Continued on Page 705.*)

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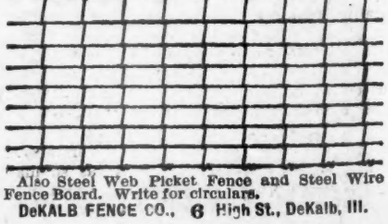

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Scientific Agriculture at the World's Fair.

(*Continued from Page* 704.)

fine wood-carving, artistic drawings and beautiful designs for wall paper, dress-patterns, carpets and other fabrics. The principal contributors to this exhibit were the colleges of Iowa, Kansas and Utah. The Lowell School of Design of the Massachusetts Institute of Technology was also a large contributor, and this institution sends a graphic representation of the composition of staple articles of human food, and of the components of the human body, with its daily requirements of food and daily wastes. A handsomely carved pulpit came from Purdue University, Indiana.

A critical examination of this college exhibit, as a whole, convinced one that the institutions represented have expended the funds entrusted to them generously and wisely to increase and add variety to their facilities for instruction. Also, that most of these colleges, or departments of universities, are now well equipped for work on the broad lines contemplated by their endowment, "to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes, in the several pursuits and professions in life." Complete as this collective display appeared to be, one could not help noting the entire failure of some institutions to be represented. None of the branch or separate institutions for colored youth, which exist in several States, responded to the invitation to contribute, excepting some photographs from Louisiana and Mississippi. The Hampton Normal and Agricultural Institute of Virginia intended to make a contribution illustrative of truck farming, with models from its shops of tools and implements adapted to this and other farm specialties, but the illness and untimely death of General Armstrong prevented. There was absolutely nothing in the collection from New Hampshire, North and South Carolina, Georgia, Florida, Texas, Arkansas, Illinois, Nebraska, the Dakotas, and several of the mountain and Pacific States. A few other States sent photographs only.

The original special committee appointed by the Association on the Collective College Exhibit consisted of President Atherton of Pennsylvania, President Smart of Indiana and Professor Morrow of Illinois. These gentlemen initiated the work, but were compelled by the pressure of home duties to discontinue the service, and it devolved upon the executive committee about a year ago. The collection, arrangement and installation of the exhibit has been managed by the latter committee, under the personal supervision of its chairman, Major Henry E. Alvord of Virginia.

Cost of Cotton Production.—The lowest price at which hand picked cotton can be sold at home to cover cost of production, varies from four to six cents per pound, according to experiments at the Texas station by G. W. Curtis and J. W. Carson, (B. 26). Machine picked cotton was produced for two and one-eighth cents per pound. The expense of hauling to the gin and back and marketing is regulated largely by the distance. Rent of land is usually based on the yield and the distance from market. The cost of hand picking is determined by the scarcity or abundance of labor during the cotton harvest. Fertilizers often increase the yield without materially increasing the cost of cultivation. To the renter cotton planting presents an intricate problem. He cannot afford to fertilize the land on a short time lease, and long time leases for a term of years, so common in other countries, are not obtainable. As a result of this the renter must depend upon thorough preparation, careful planting, persistent and proper cultivation, with an intelligent diversity of crops, to insure a reasonable profit. For the independent homestead planter, who depends upon brain and muscle to secure success, the problem takes a wider range and admits of easier demonstration by the proper use of fertilizers and the combination of such other crops with the cotton, as will best economize labor by giving steady employment through the year. Contrary to a very prevalent belief, there is still money to be made in cotton growing. The man who diversifies his farming, without discarding cotton as so many would advise, is the one who finds a profit in the staple vegetable fiber of the world.

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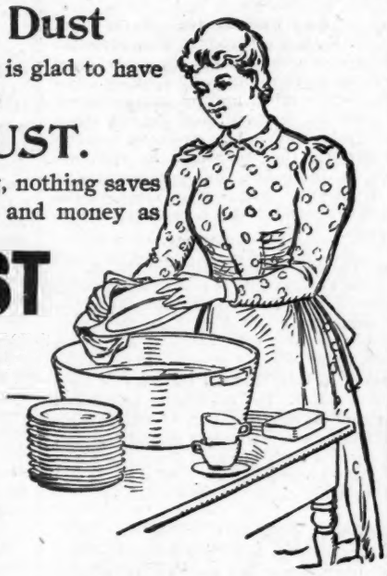

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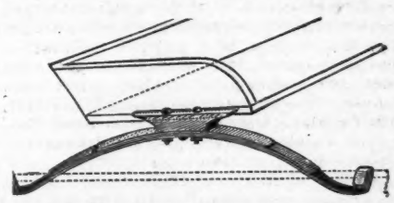

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ANIMAL AILMENTS.

Eyelashes of Dog Turned In.—Jacob Cohn, Queens Co., N. Y., has a perfectly trained setter that has the eyelashes of the left eye turned in so that it keeps the tears running all the time. The case is purely of a surgical nature. A small piece of the lid must be removed, and the cut edges stitched nicely together. Any educated veterinarian will perform the operation. By spraying the lid with cocaine before the operation it will be nearly, if not quite, painless. A muzzle must be worn for a time after, lest the wound should be scratched open.

Pasturing Calves.—J. Falk, Orange Co., N. J.: In turning calves on grass it is best to tether with a ten-foot rope during the pleasant weather in the day time. Lime water added to the milk fed to the calves will prove a preventive of acidity of the stomach, diarrhœa and worms. Lime water is readily made, as only a small quantity of lime is dissolved by water. Put a piece of unslacked lime, the size of an egg, in a pail of water; next day pour off the clear water and fill bottles, and cork, as it absorbs carbonic acid from the air if left open. Calves require shade and shelter, and clean water to drink during the hot weather.

Sour Stomach in Pigs.—T. C. Yates, Red River Co., Texas, says his pigs have a craving for dirt. They have fair appetites, but are restless, squealing, though fed all they want. Thinking they wanted something green he threw in a sod, and they all fought for it, eating dirt and all. They do not look thrifty. They have corn, milk, whey and slops. Put a mixture of equal parts of salt, wood ashes and powdered charcoal in a strong box and keep it in the pen. This will correct the indigestion, and a handful of powdered gentian mixed in the feed twice a day will restore the appetite. Pigs do best to run in a small yard where there is plenty of fresh water. No matter if they dig and get muddy. A mud bath keeps them free from lice, but they should have a dry, clean place to sleep.

Diarrhœa of Calves.—A. J. Doan, Jackson Co., Mo.: The calves which were fed in a field of wet alfalfa have diarrhœa. Put them in their stalls, give each of them a quart of milk, in which a handful of wheat flour has boiled for half an hour in a kettle of boiling water. This may be repeated every six hours. If there should be any diarrhœa after a day or two, give Epsom salts two ounces, baking soda two drams, powdered ginger two drams, warm milk half a pint. If the diarrhœa remains, give a teaspoonful of laudanum and a tablespoonful of tincture of cardamom in a teacupful of wheat flour gruel after each passage.

Mange or Sores on Oxen.—W. M. Fields, Westchester Co., N. Y., states that his oxen have raw sores all over their bodies, causing a great deal of itching. They are continually licking the sores, which makes them increase in size. They seem to dry up in winter, and break out again in the following spring. The mange of the ox is due to a parasite called dermatocoptes, which lives on the surface of the scarf skin, or external layer of the skin, giving rise to irritation, causing patches of roughened skin of circumscribed extent. The constant licking or rubbing of the ox makes sores of considerable extent. If left without this irritation, the little blisters break and form crusts after the secretion dries, and these, in turn, may extend by ulceration. The hair falls off, sometimes leaving a few stray hairs sticking up in the sore. The positive evidence of the disease is the finding of the parasite, which is a minute white insect scarcely visible to the strongest sight in the bright sunshine on paper or the spatula. When the disease is not checked it exhibits marked activity in the summer, and seems dormant in winter, or actually shows positive signs of hibernation. But for this torpidity in winter it makes ample amends during summer, digging away with might and main, and making themselves keenly felt. Though these little torments are most frequently found on badly wintered and filthy cattle, yet they do frequently attack the most robust and healthy animals. They seldom breed in other animals, but where one ox is affected his yoke fellow is sure to have the annoying colony implanted in his skin also, sooner or later. The treatment does not simply consist in destroying the parasite, but also the removal of the eggs. This can only be done by destroying them as soon as hatched, for the eggs are impervious to the applications that destroy the living colony. The cure depends upon the removal of the scabs by applying soft soap and water impregnated with carbolic acid, say a teacupful of strong soft soap suds in which a dram of carbolic acid is dissolved. This, on the thick hide of the ox, must be applied with a scrubbing brush to remove completely all the living parasites as fast as they hatch. Oxidized turpentine, is safe and effective also. Poisons are dangerous, as the animals lick all affected places they can reach with the tongue, and under such strong inducement as the acari generally offer, an ox manages to cover a good deal of his diseased hide—with his vigorous rough tongue. After each scrubbing, a free application of linseed oil will help to suffocate this population of parasites. All blankets, harness, or litter, should be fumigated with burning sulphur, or burned. Nearly all cattle having been tormented by acari require tonics, and of these arsenic should be given in the feed once a day for a week, in doses of a teaspoonful of Fowler's solution; at the expiration of this time, omit a day or two and repeat as before. The application of tar makes the subsequent washings difficult, but turpentine liniment may be applied, as a change of application may be required.

Anæmia—Hollow Horn.—J. J. Dunlap, Quebec, Canada, asks: Is there a disease called the hollow horn? In but few books of modern date will the term hollow horn or horn ail be found. The name originated in a single symptom of a disease of the blood, blood poverty, anæmia, or insufficiency of blood, because some ancient cow leech happened to find out by great experience that the animal thus suffering had a cold horn. But without also learning that the ears and feet were as cold as the horn, he only bored the horn and filled the hole with turpentine, and having found that the tail was also cold, it was slit open and stuffed with pepper and salt. This treatment never cured, but something was done. This poverty of blood may come from poor grass in low, wet pastures in summer, and bad hay, too old and woody timothy, or innutritious weeds in the badly cured, musty hay, or too much straw food to maintain the blood in a condition to even nourish the animal body without yielding a product.

Driving Horse Lathering.—M. C. Daily, Albany Co., N. Y.: It is probable that your horse is too highly fed and has too little work. Use but one small feed of thoroughly dusted hay each day, and that at night. See that he has a lump of rock salt always in the manger. In the night feed put a powder composed of one-half ounce of saltpeter, one ounce of glauber salts and two ounces of powdered gentian. Have the horse watered three times a day, at noon give only two quarts, and a swallow or two before driving out in the afternoon. Remove a quart of the night feed and add a pint of ground peas mixed with the feed. Drive your horse for two hours every forenoon and you will probably find that he will not lather after the first week. Drive slowly until your horse has got rid of the excessive food eaten. Runners, or trotters are never started in a race on a full stomach.

Feed Founder.—George Murdock, Sicamons Station, B. C., has a horse that ate wheat screenings, and foundered himself. Laminitis, or inflammation of the tender tissues of the hoofs and other tissues of the fore limbs and chest, is painful and serious from the confined condition of the delicate laminæ of the foot within the hoof, surrounding the coffin-bone and securing the hoof in its natural position. The involvement of the sensitive sole also occurs. Mild cases subside by resolution or self-cure. But generally the inflammation weakens or breaks up the tender tissues, creating permanent deformity and lameness. Stomach engorgement, especially on wheat, barley or corn, is liable to produce this destructive inflammation of the tissues of the fore feet of the horse, though when the horse's feet are so painful as to cause him to lie down to relieve the pressure of the weight of his body from his inflamed feet, and especially when all four feet are placed well under the body, and when the hind feet are also tender to a gentle tap of the hammer there exists laminitis, fever, inflammation in them all. Traveling in snow and slush, when the horse is heated, and brought in and stabled without cleansing and drying, will also excite inflammation of the feet. Founder even occurs in overfed or accidentally gorged oxen, on wheat or barley. The treatment of the above horse was defective in not having blood drawn from the feet at once, and then placing them in cold water. Tying the horse in a creek to let the running water reduce the inflammation at the soonest moment possible, is a good plan. The shoes should have been removed at once. The other treatment seemed perfectly proper. In taking the horse from the cold water, the box stall should have been bedded with six inches of sawdust made quite moist with water. An old soiled blanket should have been securely fastened upon the horse so that the damp sawdust would not chill him in lying down. This vigorous treatment would probably have saved, and will doubtless prevent destructive inflammation and perpetual lameness. Horses partially recovered from food founder have more or less rheumatic fever of the muscles and tendons of the shoulder, knee and fetlock joints, which keeps them stiff until limbered up by exercise. Such horses should have the chest and legs thoroughly hand-rubbed before they are taken out of the stable. A trial of half-dram doses of salicylate of soda in the feed three times a day for two days, and alternate with hyposulphite of soda in the same way, and with the same doses, may prove of some service.

Pulex irritans—Fleas.—Mrs. G. W. B. writes that in her section of New Jersey the dog-fleas are a source of great annoyance. Thorough cleanliness, turpentine, anise seed, decoction of stavesacre, tobacco water, fine sawdust for the dog's bed, and keeping the dog out of the house, and twice a week sponging the dog with alcohol one part, water two parts, carbolic acid half a part, will destroy all the fleas it comes in contact with. The surroundings must be kept swept clean of all litter, and the ground about the house should be sprinkled with chloride of lime and tobacco water. The dog kennel should be fumigated with sulphur fumes and kept removed from the house. The swept up litter, sprinkled with kerosene, should be burned in a safe place. Kerosene sprinkled from a water pot will prove of great service. Fleas increase in damp dirt. The fight must be perpetual.

Mange in Cattle.—Wm. Field, Westchester Co., N. Y., sent scales and scabs from sores of oxen which were tormented with itching sores for two years. The microscope verified the diagnosis of mange. Thorough daily scrubbing of the sores with soft soapsuds, and the daily application of iodide of sulphur ointment and one part in ten of carbolic acid will be useful. The eggs of the acari are not destroyed by the application, therefore the necessity of frequent applications to kill the young as soon as hatched. The female creates the irritation and itching by burrowing to lay the eggs. The application of tar oil one part, and palm oil six parts, rubbed together, should be applied for a time on the sores, even after the itching has disappeared, to protect the tissues.

Mare Injured by Barbed Wire.—J. M. Howland, Santa Barbara, Cal., had a saddle mare hurt in a barbed wire fence. The cut was below the fore foot heel near the hoof. The proud flesh was eaten out with burnt alum, but there is considerable swelling left. How can the swelling be removed? First try tincture of iodine smartly applied night and morning till an eruption appears. Then hand rub a dram of biniodide of mercury ointment at night, and apply a bandage snugly from hoof to half way to knee, making the bandage snug at the lower part, and slightly lessening to the top. Remove the bandage and thoroughly wash every morning, and re-apply the ointment. Daily exercise and light feeding should be given. Always briskly hand-rub the washed foot until it is dry before applying the ointment. If two weeks' treatment shows improvement there is hope of a final cure.

Garget, or Inflammation of the Udder.—Christopher Simons, Adams Co., Wash., has had trouble with his Jersey cows occasionally, and desires to know how to manage a caked udder. This results from cold or damp, improper or imperfect milking. It is a superficial or deep seated inflammation of the integuments or of the vascular texture of the gland, or glands, as there are four milk glands in the cow's udder—one for each teat. One, two, or all, may be involved in the affection. The gland

(*Continued on Page 707.*)

ANIMAL AILMENTS.

(*Continued From Page* 639.)

becomes swollen, hot, red and painful, and the milk decreases and curdles or coagulates, and is milked out with difficulty and in little lumps mixed with the thin milk. It has been produced by overloading or stocking the glands of new milch cows for show. Too often these showy udders lose their milk, and often their glandular function, in part or entirely, for a time or permanently. Apply hot fomentations, and support the udder by a broad bandage having openings for the teats, and fastened over the back, keeping comfortably snug. Where the swelling is great, and there is much fever, smear the whole udder with hot lard in which an ounce of laudanum is mixed, and gently hand-rub downwards. Strip out carefully all the milk; then put cushions of cotton, wool or oakum under and around the udder, and replace the suspensory bandage; give a pint of linseed oil and let the cow rest. A dram of saltpeter, dissolved in the drinking water, and small bran mashes and a handful of fresh grass, roots or steeped hay, will constitute the most appropriate diet. Should there form abcesses, they must be opened and poulticed. Scatter chloride of lime about the stall and keep everything clean.

Cure for Distemper in Dogs.—R. O. Biddulph sends us a cure for distemper in dogs. Enclose a teaspoonful of saltpeter in raw meat. Repeat the dose if improvement is seen. It is said to have succeeded in every case in which it was used. There can be no danger in its use, and the beneficial results must have been seen in young dogs, and early in the disease. But as it came all the way from South Africa, we give our numerous western readers the benefit of our kind correspondent's success in its use.

Erysipelas.—Peter Otis, Seneca Co., N. Y., has had two cows affected with a peculiar inflammation of the skin and deeper tissues, resulting in blisters having a watery fluid beneath the surface, though not forming matter, but causing sloughs. It commences at the foot, or ankle, and extends upwards. It is erysipelas, which may attack the head, which may swell so as to close the eyes and cause great distress. The swelling does not pit like dropsy, but the skin is red and hot, and where the pressure of the finger is made upon it, if the hair is thin, the redness disappears during the pressure. The swelling is so distinct or marked from the healthy skin that it seems fixed in the part, yet it may spread very rapidly, but always has this appearance. There is always fever, quick pulse, and hurried breathing, with impaired appetite. The treatment should begin with a pint of linseed oil, hot fomentations, smearing the part with lard, giving an ounce of saltpeter twice daily in the drinking water, green food, pulped roots and bran. Fortunately, in winter or spring, when this affection is most liable to occur, ensilage is procurable in most dairy sections. It is possible that sudden changes of cold and heat, or surfeiting and half starving, or very irregular feeding may have an influence; but Koch and Fehleisen attribute its origin to bacteria. It is liable to attack wounds. It is always best to separate sick animals from the well at the earliest moment possible, thus avoiding possible contagion and loss of stock.

Broken Hind Leg of Stallion.—A subscriber telegraphed: "Can I save a large, heavy stallion, whose hind leg is broken by a kick just above the hock?" We answered, "No." Though put in slings, the leverage is so great from the hock down, and the thigh is so difficult to apply splints and bandages to, that a union of the ends of the bone from certain motion will be next to impossible. Unless the union is perfect and strong, the horse cannot be used for service or work. A fracture midway between the hock and fetlock might succeed with good treatment and long and excellent nursing, A Blue Bull stallion on Long Island, broke a fore leg below the knee, and has done service for many years. There is but deformity. Though a fine trotter, his former speed has not been attained since the accident. There is no reason why a horse in good flesh, and sound health, meeting with a serious accident, should not be slaughtered and the meat sold fresh for food for menageries or dogs, fowls, or even for hogs.

A LANSINGBURG MIRACLE.

A RAILWAY MAN TALKS.

LITERALLY HALF DEAD, HIS CASE PRONOUNCED HOPELESS BY PROMINENT PHYSICIANS; A STORY OF SURPASSING INTEREST VERIFIED UNDER OATH.

(*From Troy, N. Y., Times.*)

I am the most conservative reporter on the staff. I despise the chimerical, I court the real. I burrow in facts. I am from Lansingburg. We don't often get a good thing from there, but here is one. F. C. Kimball last night gave me the following:

"I am a plain straightforward man. Originally from Lansingburg, where now reside my mother, brother and sister. Several years ago I moved to Rochester. There I was in the employ of the Erie Railroad as yard and freight superintendent. After a strain to my back, caused by heavy lifting, three years ago I developed so-called rheumatism. It was an increasing thing for two years,—at times worse, again better. I worked intermittently. If I would shut my eyes I would fall down. My feet and legs soon lost feeling—were numb. This extended to my stomach and at times to my hands. Doctors Lee and Spencer of Rochester finally pronounced my case progressive locomotor ataxia, said it was incurable, and that they could only ease my sufferings, and so I lay. Up to this time I had been sick nearly two years. Before this and for several months I was confined to my bed. Pins stuck into my limbs the full length gave me no feeling whatever; my legs seemed wooden. To pound them gave off a noise like wood. So I say, as I lay there I was *absolutely one-half dead*—dead from the waist down. There was one word written in large characters all over that sick room—C-L-A-Y. Life departed from my limbs, that word best expressed what was left. You, of course, have read of John Marshall. The reporter in describing him, described me exactly. I sent for the remedy which cured him,—for Dr Williams' Pink Pills, to Schenectady, N. Y., and tried them. I took them irregularly for two months. They didn't seem to help. All of a sudden one morning one of my legs began to prickle—seemed as though rubbed with nettles. Then, perhaps, you think I did not investigate that medicine. I began to mend fast; got some circulation, got control of my bowels, and after a few weeks got out of bed and tried to stand. At last I fetched it. Could walk—now can run. And Pink Pills cured me. The Doctors said I couldn't be cured, but I am. What I am now telling you is merely a reiteration of what I long ago wrote to the Dr. Williams' Medicine Company at Schenectady, and my affidavit to the same is now in their hands. Here also is a letter which my mother wrote to them and to which she has made affidavit, as you see."

186 Second Ave., LANSINGBURG, N. Y.

Dear Sirs:—My son Fred has just written you a letter concerning himself to which I desire to add a few words in entire corroboration of all he has said. He has told you of his agony and his cure. The remembrance of the whole thing makes me shudder as I think of it. It is all too wonderful for me. I was resigned to his fate. Now as I look at him walking about and feeling well, with his old health and ambition returned, it does seem that he has been born again and rescued from death for a fact. Could I, therefore, say too much to you of thanks in the fullness of my gratitude? Can I well cease blessing you? Yet the intensity of my feelings make my words of thanksgiving to you seem but empty indeed; for the lost is found, and he that was dead is alive again. Yours,

HARRIET J. KIMBALL.

Sworn and subscribed before me this 5th day of April, 1893. M. L. FANCHER,

Notary Public.

Mrs Kimball said: "While I believe in answers to prayer and prayed earnestly for his recovery, for I am a Christian woman, and believe my prayers were answered, I do think Pink Pills were the means the Lord used to effect my son's cure. I want you to meet my daughter, Mrs. G. H. Morrison, with whom we are living here, and the Rev. Geo. Fairlee, pastor of Westminster Church, who lives with us, and hear what they have to say." So Mrs. Kimball brought them in, and while the story as told was most complete and could be added to by nothing they might say, yet the reporter heard from the lips of the sister and their pastor, corroborative words of all that has been said. The reporter also ran across the son-in-law, Mr. G. H. Morrison, cashier of the National Bank of Troy, and spoke to him of Mr. Kimball. He is a busy man and though he could only be detained for a moment, he said: "I know nothing of the case technically. He says he was cured by Dr. Williams' Pink Pills, and I think that is about the size of it."

Mr. William H. Flandreau, the druggist at 814 River St., Troy, said: "It is the most wonderful cure from locomotor ataxia—a so-called incurable disease. Mr. Kimball tells me he owes his recovery to Pink Pills entirely and I have every reason to believe him."

Pink Pills restore pale people [and] sallow complexions to the glow of health, and are a specific for all the troubles peculiar to the female sex, while in the case of men they effect a radical cure in all cases arising from mental worry, overwork or excesses of whatever nature.

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The Farmer's Needs and Opportunities.

Brief reports of the address before the Congress of Agriculture at Chicago, Oct. 16, by J. Sterling Morton, Secretary of Agriculture, have been so unsatisfactory that we present herewith our own abstract of Secretary Morton's remarks on that occasion, and verbatim extracts, as taken from the full report which he has had privately printed.

Secretary Morton's address began by showing that land itself had no value. The very lands of eastern Nebraska, which could find no purchasers at $1 per acre in 1866, are to-day in great demand at $25 to $75 per acre. "The foundation cause of this enormous advance is largely the efforts put forth by capital to build railroads, which should relate those lands and the producers thereon intimately and profitably with the great cities and populational centers of the East. The trade between the country and the cities is products for products, and money acts only as a medium of exchange in adjusting values."

Socialism Denounced.—Secretary Morton then contrasted the independence of farm life with the uncertainties, extravagance and thriftlessness of city life. When doubt "as to whether the United States has gold enough to buy all the silver of the earth and pay for it in gold, and then maintain it as money at a parity with gold," induces a panic, the city wage earner, having saved nothing, finds himself upon the verge of starvation. He attends meetings wherein labor slavery is described and the capitalistic master is denounced, and is taught in these social schools that our government is thoroughly paternal, and its duty is to furnish work to the unemployed at remunerative figures. He is told that plutocrats are conspiring to crush out labor everywhere, forgetting that when the capitalist destroys the debtor class, he has obliterated the market in which he loans his own money, and deprives those who owe him of the power to pay. On the other hand, farmers have suffered less than any other class during the recent panic.

Foes of the American Farmer.—"The most insidious and destructive foe is the 'professional' farmer,—the promoter of granges and alliances who, for political purposes, farms the farmer. * * * He will not succeed better by forming granges and alliances—which generally seek to attend to some other business than farming, and frequently propose to run railroads and banks, and even to establish new systems of coinage for the government—than he will by individual investigation of economic questions. * * * Humanity generally and the farmer particularly has no enemy equal in efficiency for evil to ignorance. Therefore, each farmer should for himself individually investigate the various methods of cultivating land, of producing good crops and of securing remunerative markets."

Mr. Morton recommended farmers to read Adam Smith's "Wealth of Nations," as opening to him "plainly and clearly his relation to the world of consumers and commerce," rather than to read the "vicious literature of modern paternalism and its vagaries; the latter instead of developing individuality, evolves dependence and cultivates helplessness."

"The farmers of America need individualization and development by personal study and investigation. They do not need to pool their thinking faculties and their energies in vast associations, which are too often turned to political rather than to agricultural and domestic purposes. No man should give a power of attorney to any society, organization or person to think for him. * * * All the drouths, all the locusts, all the chinch bugs, all diseases of domestic animals which have afflicted agriculture, are not half such dangerous foes to the farmer as an incontrovertible or irredeemable currency; not half so impoverishing as cheap money of violently fluctuating purchasing power; not half so dangerous to his interests as a system of laws which compels him to sell his product in competition with all the world, and to buy his manufactured articles in the market whence all competition is excluded; not half so threatening as a blind adherence to the teachings of ignorant

[*Continued on Page* 709.]

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Completest of outfits for a dairy farmer. This machine has an attachment which, when the bowl has been taken out, is dropped into the Separator so that a belt can run to the churn. Write for further particulars. **Davis & Rankin Bldg. and Mfg. Co., 240 to 254 W. Lake St., Chicago, Ill.,** Manufacturers of all kinds of Creamery Machinery and Dairy Supplies. (Agents wanted in every county.)

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We make this boot ourselves, therefore we *guarantee* the *fit, style and wear,* and if any one is not satisfied we will refund the money or send another pair. Opera Toe or Common Sense, widths C, D, E, & EE, sizes 1 to 8, and half sizes. *Send your size; we will fit you.* Illustrated Catalogue FREE.

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The Farmer's Needs and Opportunities.

(*Continued from Page* 708.)

leaders, vicious demagogues and the allurements of party catchwords and party names which politically hypnotize his reasoning faculties."

Cause of Low Prices and the Remedy.—Mr. Morton held that farmers might be growing and selling at a profit twice as much grain as they now do, if their natural world market was not shut off by law, because a world's market is a great deal wider than a wofully restricted home market. "Does not every dollar's worth of imports kept out by a protective tariff keep in a dollar's worth of export grain that would otherwise leap to get out?" He advised farmers to read daily newspapers, which turn the light upon all the causes of fluctuating markets.

The Advance of Prosperity.—He believed that farm land was about to advance in value. "There are no more farms to be given away. The demand will soon be far in excess of the diminishing supply. Twenty-five years hence every acre of fertile farms in the United States will certainly sell for twice or three times its present value. The wise farmer will endeavor to keep his family on the fruitful lands which he now occupies as a home, and with his industry and frugality endeavor to purchase more good lands, so that his descendants may inherit health, industry, knowledge and sturdy independence. The intelligent farmer of the future will be a dominant element in the factors and forces which constitute popular government."

Results of Individual Wealth.—"Among the most vicious teachers in the agricultural sections of the country, are the men who declare great wealth a crime." Mr. Morton believed that protecting individual producers of wealth in their acquisition and control of it was "the best way to refine, exalt and advance mankind. This policy, applied in the United States, has stimulated invention, and has given the poorest of us comforts and conveniences which the richest could not obtain a hundred years ago. * * * The production of wealth must depend in great measure on its distribution and use, because men will not voluntarily labor to produce for some one else if society is to control what is produced. The only proper function of government is the conservation of life, liberty and property; the individual should be free to pursue happiness in his own way, having due regard to the same right vested in other individuals. Society should place all its members upon a sound equality before the law, and not attempt to evade or mitigate punishments which Nature has provided for those who violate Nature's laws." Accumulations of capital exalt the standard of education, and he favored them.

Starting a Poultry Yard.

J. F., Chicago, Ill., writes us that he is a machinist, making $2.85 per day, has a wife and two children, and has recently come into possession of forty acres of land about forty-one miles from Chicago and three miles from railroad depot. The land consists of swamp, prairie loam, a sandy ridge covered with brush and young trees, and the like. About twenty acres are good land. He says, "I have been thinking of making it into a poultry farm, and of using the ridge of woods and a portion that is in Canada thistles for the yards." And he asks a number of questions.

With the total lack of experience which our correspondent has, we should think that it would not be best to start at all, as it seems he can get a living and lay up $200 per year from his trade, as he himself states. Poultry farming, like everything else, is fascinating on paper, and it is very easy to figure out a large income from forty acres, but successful poultry farming requires experience. With the necessary experience it can be made a success. How he should start will depend upon what he aims to do. Raising of poultry may be conducted first, for market eggs; second, for market fowls, and this may be divided into raising broilers and rearing roasters; third, for a combination of the two; and fourth, for the rearing of exhibition fowls. The end will determine the means to be employed. But to take the questions in their order.

1st. Do you think it would pay? Not until you had gained experience in handling, breeding and caring for large numbers of fowls.

2d. How large would you make the yards? For pens of breeding fowls, cock and six or eight hens, a yard twenty-five by fifty feet will answer. For yards for layers in flocks of fifty, not of smaller dimensions than one hundred feet square. But no yards are needed if one adopts the plan described in "An Egg Farm," which book can be obtained at this office.

3d. Would not Cochins be a good breed to use? No. The Cochins are not the best of layers nor are they the best of table fowls. The Cochins answer admirably for fancy fowls, but there are better breeds for the practical poultry raiser. For eggs the Leghorns, for eggs and meat the Plymouth Rock and other American breeds, for table poultry the Indian game or a cross of the Indian Game and some other breed.

4th. How many incubators and what size would I need? The number and size would depend upon what you were going to do, how many chickens you intended to rear, and the like. Two five-hundred-egg and one two-hundred-egg would be sufficient to do a large business with.

5th. What other machinery would it be necessary for me to have, beside the regular farming tools? A boiler in which to cook the food, hay cutter, meat grinder, bone and shell mill—these are useful on a poultry farm.

6th. What would be the best way to make the fences for the yards? Use wire netting fastened to posts. Have boards nailed to the posts between the yards to keep the cocks from fighting. Board partitions should be about two feet or two and a half feet high, above which the netting can be stretched.

7th. How much and what help would it be necessary for me to have? That depends upon how much business is done. Yourself and a boy of fifteen would be able to take care of five hundred to a thousand hens.

8th. How and in what way would you recommend me to start? If, after what we have said to discourage you, you still think it advisable to start, we should advise you to start small, with say a single pen of fowls, cock and ten hens. From these, setting eggs under broody hens, raise as many chickens as you can, say a hundred and fifty. The next season have a larger stock, and so on increase the stock as fast as your experience will warrant. With intelligently directed efforts, in the course of a few years you would have a large stock of fowls and experience in managing them, which is important in winning success.

Should be in the Hands of Every Farmer.—The AMERICAN AGRICULTURIST is the best and most reliable agricultural journal published. It should be in the hands of every farmer, as each number is crowded with good and useful information. D. F. VANNESS, Coffey Co., Kansas.

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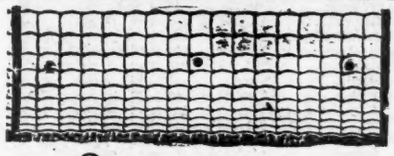

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THOSE ANSWERING AN ADVERTISEMENT WILL CONFER A FAVOR UPON THE ADVERTISER AND THE PUBLISHERS BY STATING THAT THEY SAW THE ADVERTISEMENT IN THE AMERICAN AGRICULTURIST.

TOPICS OF THE TIMES.

The Number of Farms in the United States.

AN ASTONISHING INCREASE AT THE WEST AND SOUTH, BUT A SERIOUS DECLINE IN THE NEW ENGLAND AND MIDDLE STATES.

The first publication is here made of the official count of the number of farms in the whole United States, taken in June, 1890, by the enumerators for the Eleventh Federal Census. The figures are complete.

There are, in round numbers, 4,560,000 farms in the United States, contrasted with 4,008,000 at the opening of the decade, or a gain of 550,000 in the ten years. Over 600,000 new farms were created, but the absorption of over 50,000 farms into larger

SUMMARY BY SECTIONS OF THE NUMBER OF FARMS.

Decrease.	1890	1880	Total	Per Ct.
a New England.	189,961	207,232	17,271	8.33
b Middle.....	468,624	488,907	20,283	4.15
Illinois.....	240,681	255,741	15,060	5.89
Nevada.....	1,277	1,404	127	9.05
New Mexico..	4,458	5,053	595	11.77
Dist. of Col...	382	435	53	12.18
Tot'l dec. Sts.	905,383	958,772	53,389	5.57

Increase.	1890	1880	Total	Pr. Ct
h Middle South...	782,587	720,169	62,418	8.67
i The South.....	1,044,644	810,473	234,171	28.89
c Central exc. Ill.	768,350	729,532	38,818	5.32
d Northwestern..	209,951	113,682	96,269	84.69
e Western.....	720,007	602,874	117,133	19.43
g Pacific.....	96,480	58,680	37,800	64.42
f Mountain, exc. Nev. & N. M..	28,332	14,725	13,607	92.41
Total inc. Sts..	3,650,351	3,050,135	600,216	19.67
Total dec. Sts..	905,383	958,772	—53,389	—5.57
Aggregate, U. S.	4,555,734	4,008,907	546,827	13.64

ones in the New England and Middle States and Illinois reduced the net gain to the number stated. The gross gain in the number of farms is about 20 per cent., the decrease was 5.57 per cent., leaving a net gain of 13¾ per cent. in the number of farms in the United States for the ten years.

Why Eastern Farms are Fewer.—The decrease of over 8 per cent. in the number of New England farms, of 6 per cent. in New York, and 10 per cent. in New Jersey is largely due to the natural law of selection. Many homesteads have been sold out because the land was so sterile or the situation so far removed as to be neither profitable nor pleasant, the land being added to existing holdings, most of it to be used for woodland or pasture. The sellers have bought other farms in more favorable locations, or have gone West or South, or quit farming altogether. Probably a large proportion of the 50,000 farms that have been absorbed were homesteads of those who took part in the great Western migration from 1870 to 1885, but which since then has practically ceased from New England and New York. Larger farms have also followed the increasing use of labor-saving implements.

The decrease in the number of Illinois farms is partly due to the great growth of towns and cities encroaching upon the farms, and is also due to Western emigration. What other causes may have been at work here or in the Eastern States can be better judged when the figures are available as to the size and tenure of the farms. Nevada's declining number of farms reflects the gradual decay of that almost deserted State, while a decrease of 12 per cent. in the number of New Mexico's farms shows that her agriculture is being more confined to the irrigable region, but that as compared with Arizona she has made little progress.

The Central States Growing Old.—Indiana and Ohio have but few more farms than in 1880, evidently due to the cutting up of large estates into smaller homesteads—a healthy sign, but also one of age. Wisconsin and Michigan have had several thousand new farms carved out of their wild lands, and smaller farms are also the rule.

The Great Northwest's development has been magnificent, the five States having nearly doubled their farms by adding nearly 100,000 to the number. The Dakotas make the grandest showing, and one can readily imagine that Wyoming is no longer a mere range country. The Mountain States make a gratifying exhibit. The Pacific Coast region has added enormously to the number of its farms—Washington 176 per cent., Oregon 57 per cent., and California 47 per cent., most of these being farms created out of new lands by irrigation enterprise and homestead entry. Yet one can but believe that this country, from the Dakotas to the Pacific, is yet in the infancy of its agricultural development.

The Western Group of States have "filled up" to use the expression in its Western sense. Iowa, Missouri and Kansas have not largely increased the number of their farms. Much of arid Western Kansas has gone back to range usage, and only where irrigation is at hand can agriculture be permanently assured in that region, the attempt to develop which without this safeguard constitutes one of the saddest chapters in Western effort that has cost dearly and left its impress on the whole body politic. Nebraska, more favored by nature in her Western regions, has progressed steadily, and now has probably twice as many farms as fourteen years ago.

The New South is rightly named, and her agricultural development, as measured by the increase in the number of her farms, is indeed gratifying. It indicates that the trend of immigration southward has already taken on considerable proportions and gained an impetus that is destined to make still greater progress in future. Excepting the still comparatively new State of West Virginia, the Middle South has not greatly diversified its agriculture as indicated by smaller farms, or by the development of new lands.

It is in the eight strictly Southern States that the cutting up of old plantations into smaller farms is most marked. The increase is also due to the settlement of considerable public or wild land in these States. That nearly quarter of a million new farms should have been created in these eight States, thus adding one-third to the number that were reported by the census of 1880, is as remarkable as it is encouraging.

STATES IN WHICH NUMBER OF FARMS DECREASED.

	1890	1880	*Decrease.* Total	Per Ct.
a *Connecticut..	26,350	30,598	4,248	13.88
Dist. of Col...	382	435	53	12.18
Illinois.....	240,681	255,741	15,060	5.89
a Maine.....	62,013	64,309	2,296	3.57
a Mas'achusetts	34,374	38,406	4,032	10.49
Nevada.....	1,277	1,404	127	9.05
a N. Hampshire	29,151	32,181	3,030	9.41
b New Jersey...	30,828	34,307	3,479	10.14
New Mexico ..	4,458	5,053	595	11.77
b New York.....	226,239	241,058	14,819	6.15
b Pennsylvania	211,557	213,542	1,985	.93
a Rhode Island.	5,500	6,216	716	11.52
a Vermont.....	32,573	35,522	2,949	8.30
Total	905,383	958,772	53,389	5.57

*The italic letters refer to the group in which each State is included in the summary statement.

INCREASE IN NUMBER OF FARMS.

	1890	1880	*Increase.* Total	Per Ct.
i Alabama.....	157,772	135,864	21,908	16.13
f Arizona.....	1,426	767	659	85.92
i Arkansas.....	124,760	94,433	30,327	32.12
g California.....	52,894	35,934	16,960	47.19
f Colorado.....	16,389	4,506	11,883	263.71
d Dakota, North	27,611	17,435	60,334	346.05
d Dakota, South	50,158			
h Delaware.....	9,381	8,749	632	7.22
i Florida.....	34,228	23,438	10,790	46.04
i Georgia.....	171,071	138,626	32,445	23.41
d Idaho.....	6,603	1,885	4,718	250.19
c Indiana.....	198,167	194,013	4,154	2.14
e Iowa.....	201,903	185,351	16,552	8.93
e Kansas.....	166,617	138,561	28,056	20.25
h Kentucky.....	179,264	166,453	12,811	7.69
i Louisiana.....	69,294	48,292	21,002	43.49
h Maryland.....	40,798	40,517	281	.69
c Michigan.....	172,344	154,008	18,336	11.90
d Minnesota.....	116,851	92,386	24,465	26.48
i Mississippi.....	144,318	101,772	42,546	41.81
e Missouri.....	237,879	215,575	22,304	10.34
d Montana.....	5,603	1,519	4,084	268.86
e Nebraska.....	113,608	63,387	50,221	79.23
h No. Carolina..	178,359	157,609	20,750	13.16
c Ohio.....	251,430	247,189	4,241	1.72
g Oregon.....	25,530	16,217	9,313	57.42
i So. Carolina...	115,008	93,864	21,144	22.53
h Tennessee.....	174,412	165,650	8,762	5.29
i Texas.....	228,193	174,184	54,009	31.00
f Utah.....	10,517	9,452	1,065	11.28
h Virginia.....	127,600	118,517	9,083	7.66
g Washington...	18,056	6,529	11,527	176.55
h West Virginia	72,773	62,674	10,099	16.11
c Wisconsin.....	146,409	134,322	12,087	8.99
d Wyoming.....	3,125	457	2,668	583.81
Total.....	3,650,351	3,050,135	600,216	19.67

Current Comment.

A Traveling Fraud.—We have received several letters from subscribers in New York State, Connecticut and Pennsylvania, and one from Ohio, very similar to the following, from an esteemed subscriber at Ansonia, Conn.:

A well-dressed and gentlemanly, but very inquisitive fellow drove up in front of my place yesterday (October 19th) and claimed to be a representative, or connected in some way, with the AMERICAN AGRICULTURIST. He is traveling through the New England States, to learn what he can of the financial condition and general business outlook for the farmers of this section; also if there is much farm property for sale, and whether such property has increased in value or not of late years. He asked many other similar questions, which aroused my suspicion as to the man's honesty.

No such party is in our employ. He is a fraud. Judging from the apparently widespread manner in which this scheme is being worked, the bunco steerers or other swindlers who fleece the farmers by pretending to buy farms, or by other methods, are abroad in the land, with some new device for obtaining money under false pretences. All such schemers should be given a wide berth. The peculiarity of the game thus far is that the man (or men) simply inquires into farmers' financial standing, and does not try to sell anything, or even take an order. That, probably, will be attempted by a confederate later. A large number of reputable farmers and others are agents or club-raisers for the AMERICAN AGRICULTURIST, and can be trusted as such, being usually well known, or if not are supplied with credentials, so there need be no fear of confusing our friends with this glib-tongued inquirer into other people's business.

The Columbian Dairy Tests.—At the Chicago World's Fair, fifty men and seventy-five cows have been doing their best to demonstrate which cow and which breed of cows will make the greatest net profit in the milk, butter and cheese tests. The Jersey, Guernsey and Shorthorn breeds competed. The cows were carefully chosen by the cattle clubs of America, and each breed was in charge of a superintendent selected by the owners to manage each herd and determine the kind and amount of feed. Each cow was charged with the amount of food she consumed, and credited daily with her proportion of the amount of cheese, butter, whey, skim milk and buttermilk, produced by her breed, the details of the test, and the daily weighing of each cow's feed and milk being in charge of a special committee. The Jerseys won the thirty-day test. They produced 113 pounds more butter than the Guernseys, and 175 pounds more than the Shorthorns. The best five cows in the thirty-day test were the Jerseys, Brown Bessie and Merry Maiden, the Shorthorn, Kitty Clay 4th, the Jersey, Stoke Pogis Regina, and the Guernsey, Purity. The best five Jersey cows were Brown Bessie, Merry Maiden, Stoke Pogis Regina, Ida Marigold and Sheba Rex. The best five Guernsey cows were Purity, Careno, Vesta's Valentine, Sweet Ada and Materna. The best five Shorthorn cows were Kitty Clay 4th, Bashful 2d, K'tty Clay 3d, Waterloo Daisy and Nora.

United States Railways.—The last report of the Interstate Commerce Commission states that the gross earnings of railways in the United States amounts in round numbers to eleven hundred million dollars, the operating expenses being seven hundred eighty millions, leaving the net earnings at three hundred ninety millions dollars. To this must be added the net income from railway investments, which was one hundred forty-one millions, swelling the total profits to over half a billion dollars. Nearly one-fifth of this amount was paid in dividends to the stockholders. The income account from all of the territory lying south of the Ohio and west of the Missouri and Mississippi rivers shows a deficit. The passenger revenue for the railways for carrying over half a billion passengers was two hundred eighty-six million dollars, the postal service revenue was twenty-six millions, the receipts from express companies was twenty-two millions and the freight revenue amounted to nearly eight hundred million dollars. The total number of railway corporations was one thousand eight hundred and twenty-two, of which eight hundred and ninety-nine maintained independent operating accounts, and seven hundred and twelve were independent operating companies. Of the seven hundred and sixty-one subsidiary companies, three hundred and twenty were leased for a contingent money rental, the remainder being operated under forms of traffic agreement not easily subjected to classification. During the fiscal year, nine roads were abandoned, nineteen were merged into larger corporations, seventeen were re-organized and sixteen were consolidated.

(*Continued on Page* 711.)

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Your Dealer should keep them. Write anyway, and at once, for Samples. FREE

TOPICS OF THE TIMES.

(*Continued from Page* 710.)

The total railway mileage was 171,563½ miles. The **greatest** increase was in the New England States **and in the** territory east of the Missouri **river, and west of** Michigan and Indiana, though North Car**olina** leads in railway construction with an increase of two hundred and thirteen miles. There **are** forty-three railway companies operating over one thousand miles each, and together controlling nearly one hundred thousand miles or about three-fifths of the total mileage. The number of **tons of freight carried** was over seven hundred **millions,** the average haul per ton being nearly one hundred and twenty-five miles. The chief efforts of the Interstate Commerce Commission have been directed to the establishment of uniformity in the form of reports from carriers demanded by the various railway commissions of the country, and in the method of accounting by railways. It is recommended that the latter should be supervised by a national Bureau of Statistics and Accounts, as such a bureau would assist in the execution of the Interstate Commerce law by creating the conditions under which the law would act automatically. To judge of the justice or injustice of rates, there should be at command, complete and trustworthy statistics of transportation. It is further recommended that the express companies, corporations owning depot property, elevators and other means used by carriers for interstate traffic, and carriers by water so far as they engage in interstate traffic, should all be required to make reports to the Interstate Commerce Commission. As the railway industry makes each year larger demands upon the labor of the people, employing one person in every seventy-nine of the total population, and carries most of the people and most of the wealth of the nation, the laws for common carriers should be very carefully framed.

Prairie Hay.—In Illinois and the prairie States west of the Missisippi river, it is a matter of common experience that horses which have had their usefulness impaired by heaves and other diseases in the timothy and clover States of New York, Pennsylvania and Ohio, from improper feed and treatment, have fully recovered upon being taken to the prairies, turned loose on the wild pasture in summer, and fed exclusively on prairie hay in the winter. Thus recuperated, they have performed excellent service for years. If one or more varieties of grass could be brought into general cultivation, which would have equal value for horse forage with the native prairie grasses, they would be immediately adopted by skilled horsemen, in preference to the tame grasses now in general cultivation both in Europe and the United States. Owing to the increased demand for prairie hay, the Chicago Board of Trade has adopted the following inspection rules: Prime prairie hay shall be purely upland hay, free from swale grasses, of good color, well cured and free from must. No. 1 prairie hay shall be upland and midland prairie hay, of good color, well cured and free from must. No. 2 prairie hay shall be swale or slough hay, either wholly, or mixed with upland, of good color, well cured and free from must. No. 1 timothy shall be timothy, not mixed with more than one-fifth of other tame grasses, of good color, well cured and free from must. No. 2 timothy mixed with not more than one-third of other tame grasses, of good color, well cured and free from must. Mixed hay shall consist of mixed tame grasses, of good color, well cured and free from must. No grade hay shall be all kinds of hay, badly cured, stained, or in any way out of condition, the certificate of inspection to state whether it is tame or prairie hay. All certificates of inspection shall show the grade and number of bales in each car or lot inspected and plugged; and when intended for shipment, the final inspection or plugging shall take place at the time of shipment in order to be certain of the sound condition of each bale. The fees for inspection are $3 per carload, to be divided equally between the buyer and the seller. Prime prairie hay, inspected under these rules, will prove a very valuable food for horses and cattle, being nutritious, free from dust, and furnishing an excellent variety.

American Hay in Germany.—Russian hay has been excluded from Germany by government decree, and the German chemists have been analyzing some poor hay which America has unfortunately exported to Europe. The samples showed a deficiency of protein varing from three to thirty per cent. as compared with European hay. Attention is called to the fancied danger of introducing new insects. Much of the American hay was mixed with noxious weeds and innutritious species of grasses, instead of being the clean timothy and clover in demand by the European feeder. If Americans wish to develop a profitable market in Europe for hay, they should export the very best product obtainable, well cured and baled, and carefully cared for during shipment. The old-world farmer will not have his stables made a dumping ground for half-rotted grass and weeds, merely because hay is scarce, but will promptly reduce his stock if he cannot buy good feed.

Late Planted Wheat in the South.—At the North Carolina station, F. E. Emery (P. B. 54), planted winter wheat on December 24th after turnips had been taken off the land. The depth of planting was carefully gauged by a dibble. The average yield per acre, when planted at a depth of two inches, was 24⅓ bushels; planted three inches deep, it was $32\frac{1}{10}$ bushels; planted four inches deep the yield was $23\frac{7}{10}$ bushels per acre. It will be noticed, therefore, that the three-inch planting was decidedly preferable. Late in the following March the best stand was noticed on the shallow planting, and the more scattering stand on the deepest planting, though the plants on the latter were almost as large and vigorous as the others. The planting was very late, however, and it is probable that with an earlier sowing the result of the deepest planted seed would have been more favorable. The experiment shows the possibility of a good harvest from winter wheat planted very late in warm climates.

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Book Reviews.

WEEDS, AND HOW TO ERADICATE THEM. By Thomas Shaw, Professor of Agriculture in the Ontario Agricultural College, Guelph, Canada, Toronto. The J. E. Bryant Company (Limited), 1893. 176 pp., il., 16 mo., cloth.

This little volume is the outcome of much experience in dealing with weeds, and of much study and thought as to the best methods of eradicating them. The author believes that no farmer need despair of having a perfectly clean farm, if he has within him the necessary determination and energy to put into practice the methods of weed eradication which are recommended. There are chapters on the prevalence of weeds, the evils which arise from their presence, the possibility of destroying them, the agencies concerned in the distribution and propagation of noxious weeds, the methods and principles generally applicable in their destruction, and plain and careful directions for eradicating all the common weeds which trouble the North American farmer. It is fortunate that this, the first book published on American weeds, should have been prepared by so practical a scientist as Professor Shaw. Sold by Orange Judd Company. Price, postpaid, $1.

OUR NATIVE GRAPE. Grapes and Their Culture, also Descriptive List of Old and New Varieties. Published by C. Mitzky & Co., Rochester, 1893. 200 pp., il., 8 vo., cloth.

The materials for this volume have been gathered by the assistance of grape growers in all parts of the United States, and compiled and arranged that the experience of the best experts of the country may serve as a guide to the advancement of grape culture. Owing to the development within the past decade of better and earlier varieties of table grapes, viticulture has shown a most remarkable growth. Yet so large is the demand for choice fresh grapes that there is less danger of this industry being overdone, than there is of a surplus of any other kind of fruit. The grape grower's vocation properly, promptly and intelligently attended to is one of the pleasantest, most healthful, respectable and enjoyable in the whole range of human industries connected with the tilling of the soil, and this book fully describes all the named varieties as cultivated. Sold by Orange Judd Company. Price, postpaid, $1.50.

A HANDBOOK OF THE DESTRUCTIVE INSECTS OF VICTORIA, with Notes on the Methods to be Adopted to Check and Extirpate Them. Prepared by Order of the Victorian Department of Agriculture by C. French, F. R. H. S. Government Entomologist. Melbourne: Australian Government. 1893. 222 pp., il., 8 vo., cloth. Two volumes, $1 each.

This work on the destructive insects of Victoria, Australia, has been prepared by the Victorian Department of Agriculture, for the benefit of agriculturists and horticulturists. Technical terms are used only where considered absolutely necessary, although on the suggestion of entomologists, the authorities for most of the specific names of the many insects figured are given. The work is magnificently illustrated with good colored plates, prepared by the author. It cannot fail to be of great assistance to the Australian farmer and fruit grower.

OUR FARMING; Or How We Have Made a Run-Down Farm Bring Both Profit and Pleasure. Potato, Wheat and Clover Culture, Tillage, Tile Drainage, Manure Saving, etc., etc. Treated Independently from A to Z. By T. B. Terry, Philadelphia: The Farmer Company. 1893. 367 pp., il., 8 vo., cloth.

The substance of this book can be found scattered through the many articles which its author has written for the press, but in this book they will be found in a more convenient form. The story of how a run-down Ohio farm was made profitable by proper rotations and fertilizers is well and enthusiastically told. The author is not afraid to criticise other farmers, or even himself, and the fact that the book is an autobiography as well as the story of the actual operations on one farm adds to its interest. Sold by the Orange Judd Company. Price, postpaid, $2.

THE FRIENDSHIP OF LEARNING AND OTHER POEMS. By Harmon Seeley Babcock. Published by the Author. Providence, R. I.: 1893. 119 pp., 16 mo., cloth. $1.

The readers of the AMERICAN AGRICULTURIST have long been edified by the delightful and authoritative descriptions of poultry written by the author of this volume, who is also responsible for the correctness of the "American Standard of Perfection in Breeds of Fowls." Not only has the study of feathered creatures served as a pleasant avocation relieving the arduous duties of his profession, but he has also found recreation in these poems, the most of which have been written for various public occasions. Every farmer's boy will be charmed with the descriptions of the furrowed fields, and of the harvest. The verses have a classic movement, as if Virgil were singing again among his fields. Sold by Orange Judd Company. Price, postpaid, $1.

LOW COST POULTRY HOUSES. Plans and Specifications for Poultry Buildings, costing from $25 to $100, with a Chapter on Poultry House Conveniences. Illustrated. A Valuable, Practical Treatise for Amateurs on Poultry Buildings. By J. Wallace Darrow, Chatham: The Fancier's Review Printing House. 1893. 48 pp., il., 8 vo., paper.

In this little work nothing elaborate is attempted. The plans and descriptions are those of buildings in actual existence, and not of imaginary air castles. The fact has been kept in mind that the majority of poultrymen are not millionaires, and thus do not wish $1,000 structures to house $100 to $200 worth of birds. The plans and specifications presented call for low cost poultry houses not exceeding $100 in cost, the majority being under half that amount. Each description is so explicit that with the accompanying illustration a poultryman may construct a building after the plan which pleases him best, or he may gather ideas from different plans to formulate a new plan which best suits his wishes. Sold by Orange Judd Company. Price, postpaid, 25 cents.

AGRICULTURAL BIBLIOGPAPHY OF MAINE. Biographical Sketches of Maine Writers on Agriculture, with a Catalogue of Their Works; and an Index to the Volumes on the Agriculture of Maine from 1850 to 1892. By Samuel L. Boardman, Augusta, Me.: Published by the Author. 117 pp., il., quarto, paper.

This magnificent volume was prepared as a contribution to the department of agricultural literature and statistics of the World's Columbian Exposition. The biograpical sketches are those of leading writers upon farming, either native or resident of Maine. The aim of the author has been to present the name of every contributor to agricultural literature whose writings have taken considerable rank in agricultural annals, and if any have been omitted it has been from want of knowledge or information regarding them. Many native Maine authors on farming have won wide distinction for their elaborate works, while all have performed an honorable part in the agricultural literature of America.

Other Publications.

MISCELLANEOUS WORKS.

ALBERT MERTON, THE FARM HAND. A Domestic Story of Life among Working People. By George D. Hunt. Published by the Author, Salem, Ohio. 79 pp., il., 8 vo. paper. 35 cents.

WASHINGTON BROWN, FARMER. The Story of a Farmer's Wheat Combine. By LeRoy Armstrong. Author of "An Indiana Man." Unity Library, No. 26. Chicago: Charles H. Kerr & Co. 326 pp., 12 mo., paper. 50 cents.

JOURNAL OF THE BRITISH DAIRY FARMERS' ASSOCIATION. For the Improvement of the Dairy Industry of Great Britain. Edited by Wm. C. Young, Secretary, London, E. C. 226 pp., 12 mo., paper. 75 cents.

WHAT THE DEPARTMENT OF AGRICULTURE HAS DONE AND CAN DO FOR AGRICULTURE. By C. V. Riley, Washington, D. C. Pamphlet.

ONTARIO BUREAU OF INDUSTRIES. Agricultural Statistics. C. C. James, Secretary, Toronto. 120 pp., 8 vo., paper.

KINDNESS TO ANIMALS. A Manual for Use in Schools and Families. New York: The American Society for the Prevention of Cruelty to Animals. 53 pp., 32 mo., paper. Four cents each. $2 per hundred.

PULVERIZED FLORIDA SOFT PHOSPHATE. Its Value and Availability. By P. B. Wilson. Standard Phosphate, Mining and Chemical Co., Kendrick, Florida. Pamphlet.

JOURNAL OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND. Third Series. Volume IV, Part III, No. 15. Ernest Clarke, Secretary. London: John Murray. Pp. 453-656., il., 8 vo., paper. $1.50.

INDIANA at the World's Columbian Exposition. Report of B. F. Havens, Executive Commissioner, Board of World's Fair Managers of Indiana. Chicago: Rand, McNally & Co. 1893. 32 pp., il., 8 vo., paper.

EDUCATION OF BUSINESS MEN IN EUROPE. A Report to the American Banker's Association, through its Committee on Schools of Finance and Economy. By Edmund J. James, Ph. D., Professor in the Wharton School of Finance and Economy, University of Pennsylvania. New York: American Bankers' Association. 1893. 232 pp., il., 8vo., paper.

ON CERTAIN PECULIAR STRUCTURES OF LEPIDOPTERA. By C. V. Riley. Extract from Proceedings of the Entomological Society of Washington, D. C. Pamphlet.

ONTARIO SWINE BREEDERS' ASSOCIATION. Annual Report. F. W. Hodson, Secretary. London, Canada. 119 pp., il., 8 vo., paper.

SALT. Its Use in Agriculture. A Lecture by W. Chrimes, of Winford, Cheshire, England. Leaflet.

A NOVEL PROPOSITION. Revolutionizing the Distribution of Wealth. Farm Products Moved as Mail Matter at a Uniform Rate for All Distances. Of Interest Alike to Agriculture, Manufacture, Commerce and Labor. By David Lubin, Sacramento, Cal. Pamphlet.

LATHYURS SYLVESTRIS. Instructions for the Cultivation of the Flat Pea. By A. B. Wallis, Dybeck, near Skurup, Sweden. Translation from the Journal of the General Swedish Seed Association. Compliments of Victor E. Rhodin, Gothenberg, Sweden, Commissioner to the World's Columbian Exposition.

BOOK NEWS. A Monthly Review of New Books. Philadelphia: John Wanamaker. Fifty cents per year.

THE AMERICAN MAGAZINE OF NATURAL SCIENCE. A Monthly, Devoted to the Study of Nature. Des Moines, Iowa. Fred R. Stearns & Co. Twenty-five cents per year.

RUSSIA. Statistics of Cereals. In Russian. St. Petersburg: Imperial Government, 1893. 117 pp., il., maps, 8 vo., paper.

OXFORD DOWN FLOCK BOOK. Volume V. Rams No. 1362-1583. Ewes No. 344-591. R. Henry Rew, Secretary. Norfolk House, Norfolk St., London, W. C. 1893. 110 pp., 8 vo., cloth. $5.

AGRICULTURAL EXPERIMENT STATION BULLETINS.

ARKANSAS—At Fayetteville. Fodder (B. 24).

CONNECTICUT—At New Haven. Fertilizers and fertilizer laws (B. 116).

DELAWARE—At Newark. Anthrax: Precautions necessary to prevent its spread (B. 20). Insects injurious to stored grains (B. 21).

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MAINE—At Orono. Annual report of experiments.

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NEBRASKA—At Lincoln. Southern cattle plague or Texas fever (B. 28).

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RHODE ISLAND—At Kingston. Wild and domesticated turkeys (B. 25).

TENNESSEE—At Knoxville. The rational use of feeding stuffs; Winter dairying in Tennessee (B. 2, VI).

CANADA—At Ottawa. Uses and composition of grasses (B. 19). At Toronto. Annual report of experiments.

UNITED STATES GOVERNMENT PUBLICATIONS.

UNITED STATES DEPARTMENT OF AGRICULTURE, Washington, D. C. The Prairie Ground Squirrels or Spermophiles of the Mississippi Valley: Natural enemies of spermophiles; bounties for their destruction; methods of destroying prairie dogs and spermophiles, and an account of the food, habits and distribution of five species of spermophiles (O. M. B. 4). Suggestions for the Establishment of Food Laboratories in connection with the agricultural experiment stations of the United States: A paper prepared by Hon. Edward Atkinson of Boston, Mass., with a view to point out the need of scientific investigations relating to the nutritive value of the various food stuffs, the proportions in which they should be combined to accomplish particular results, and the methods of their preparation best adapted to insure digestibility, Report of the Statistician: Crop report; notes from reports of State agents; imports of hay into the United Kingdom; cereal crops of France and Italy for 1893; citrus fruit crop in Italy for 1892-'93; production, commerce, and consumption of wine in Italy; corn as food for horses in Germany; reports from consular officers relating to crops in Germany, Scotland, New Brunswick and Ontario; domestic and transatlantic freight rates (S. B. 109), and synoptical summary of the crop report, showing the estimated condition of cotton; the rate of yield per acre of wheat, rye, oats and barley; and the final report for the season of the condition of corn, potatoes, buckwheat, tobacco, and sugar cane. Monthly Weather Review: A summary of weather conditions observed throughout the United States during August, based upon the reports of three thousand observers, and intended chiefly for meteorologists. Contributions from the United States National Herbarium: Pacific coast grasses; descriptions of new or noteworthy grasses from the United States; descriptions of new grasses from Mexico; descriptions of new plants from Texas and Colorado; list of plants new to Florida; descriptions of three new plants; list of lichens from California and Mexico, collected by Dr. Edward Palmer from 1888 to 1892. Eighth and Ninth Annual Reports of the Bureau of Animal Industry: Transactions of the Bureau,

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covering the inspection and quarantine work, and the field and laboratory investigations; investigation of infectious diseases of domesticated animals; investigation of the effects of bacterial products in the prevention of diseases; investigations conducted by the biochemic laboratory; investigations relating to the treatment of lumpy jaw or actinomycosis in cattle; investigations into the nature, causation and prevention of Southern cattle fever; condition of the poultry and egg industry; the mule, its uses, how to breed, grow, prepare for market, and sell; contagious diseases among domestic animals in foreign countries; supposed *maladie du coit* among horses in Nebraska; cattle and sheep industry of Colorado; "bottom disease" among horses in South Dakota; laws of the States and Territories for the control of contagious and infectious diseases of domestic animals, and miscellaneous reports of correspondents.

CATALOGUES ACKNOWLEDGED.

S. L. ALLEN & CO., Philadelphia, Pa.: Illustrated and descriptive catalogue of flexible fliers, flier sleighs, and flier coasters. Any one intending to make the boys happy should send for this circular that he may be able to judge for himself about the excellence of these various sleighs.

WM. PARRY, PARRY, N. J.: Descriptive and illustrated catalogue of small fruit plants, grapevines, and fruit and ornamental trees. Thirty acres of nursery stock.

PITCHER & MANDA, Short Hill, N. J.: Hardy Plants and Their Uses. Complete list of the best hardy border plants; also of the best varieties of hardy flowers for cutting. Also a neat pamphlet entitled, "Chrysanthemums, Their History, Classification, Culture, etc."

E. M. RUMPH, Marshallville, Ga.: Special circular of palmetto asparagus, pearl millet, peach trees, and other specialties.

The World's Agricultural Congresses.

A great work has been carried on at Chicago during the Columbian Exposition, by the World's Congress Auxiliary, having for its motto, "Not Matter, but Mind; not Things, but Men." The conception, leadership and inspiration of this movement has been Charles C. Bonney, a Chicago lawyer and philanthropist. A remarkable series of meetings has been held almost continuously for over five months, considering a wide range of subjects bearing on human affairs. These meetings have been held at the Art Institute, on the lake front, near the heart of the city, and seven miles from Jackson Park. They have been attended and addressed by men and women from all quarters of the globe, from nearly every civilized country, and have well earned the title of World's Congresses. Some have been crowded day after day with audiences numbered by thousands and full of interest, like the Congress of Religions, and others have been almost failures.

The Agricultural Congresses came among the last, occupying the third week in October, and were about an average of the series in attendance and interest. Samuel W. Allerton, one of the noted farmers and stockmen of Illinois, was the general chairman, and the active and managing man of this group of gatherings was Professor Morrow, of the Agricultural Department of the University of Illinois. General sessions were held every afternoon and evening, and the body divided in the mornings into nine special congresses. These considered (1) Fish and Fisheries, (2) Agricultural Organizations and Legislation, (3) Forestry, (4) Veterinary Surgery, (5) Good Roads, (6) Household Economics, (7) Agricultural Education and Experiment, (8) Farm Life and Mental Culture and (9) Ornitholgy. Well-known specialists presided over these different branches, the sixth and eighth being conducted and mainly attended by women.

At the opening session on Monday afternoon, October 16th, addresses of welcome were made by President Bonney and Chairman Allerton, and responses followed from six or eight representative men and women from foreign countries, who spoke briefly of the agricultural interests of their people and the condition of the farming classes. The same evening the first formal address was made by Hon. J. Sterling Morton, Secretary of Agriculture and Honorary President of these Congresses. The later general sessions consisted of papers on subjects of a general agricultural character, read by Secretaries of State Boards, other prominent farmers, editors of rural journals, a few women, and a few foreigners. Many of these papers were carefully prepared, but were mainly historical and statistical, leading to little discussion; they ought, however, to be published and preserved for reference.

The branch Congresses, where specialists met and rubbed against each other—where the doctors disagreed—were the places for lively discussions and arousing popular interest. The branches not only occupied the forenoons, but their programs were so full and their proceedings so earnest, that they continued during the general sessions, and drew heavily from the attendance thereat. The first, fifth and seventh of the branches above named were the most spirited, although the fourth and sixth were also well attended.

A good many national organizations merged their annual meetings this year in these Chicago gatherings of similar nature. Thus the Congress on Fisheries included the Conference of State Commissioners of Fisheries and Game, the Veterinary Congress absorbed the thirtieth annual meeting of the United States Veterinary Medical Association, and the Association of American Agricultural Colleges and Experiment Stations almost lost its identity in the Congress of similar name.

Foreigners participated in nearly all these agricultural congresses, and among the most interesting features were the accounts of farm life and agricultural progress in distant lands, and the views of these visitors upon the various questions under discussion.

The main good resulting from these congresses has been the extension of personal acquaintance and the broadening of views by conference and discussion between persons having like interests, but subject to varying conditions in many different parts of the world.

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MATTERS OF BUSINESS.

November Crop Report.

Corn.—The November returns to the Department of Agriculture of the rates of yield per acre make the average for corn 22.6 bushels, which is the smallest yield reported, excepting those of 1886, 1887 and 1890, for the past ten years. The yields for those years were, respectively, 22, 20.1 and 20.7 bushels. It is less than the average for the ten years, 1870 to 1879, by 4.5 bushels; less than the average for the succeeding decade, 1880 to 1889, by 1½ bushels, and less than the average for the three years, 1890 to 1892, by a little over 1 bushel.

The result is in harmony with the reported indications during the growing season. The July returns of condition were high, being 93.2, from which point there was a rapid decline, ending in the returns of October at 75.1, a fall of a little over 18 points, due in the main to the severe, extensive and persistent drouth. The rates of yield of the principal corn States are reported as follows: New York, 29.3; Pennsylvania, 24.9; Ohio, 24.3; Michigan, 23.7; Indiana, 24.3; Illinois, 25.5; Iowa, 35.4; Missouri, 27.5; Kansas, 20.3; Nebraska, 25.

Potatoes.—The November returns relative to potatoes give the estimated average yield per acre in bushels. The yield per acre, as averaged for the whole country, is 72.2 bushels. This is 7.8 bushels less than the average for a ten-year period ending 1889. The general quality is shown to be good, and though the dry weather tended to reduce the size of the tubers, they are generally sound and mealy. The percentage of quality stands at 89.

Hay.—The average yield of hay is reported at 1.32 tons per acre, as against 1.17 tons in 1892. Except in Florida the yield is generally below this average in the Atlantic States, owing chiefly to the long-continued drouth. The returns by States range from half a ton per acre in Delaware, to 2.66 tons per acre in Nevada. It must be borne in mind, however, that in most of the States reporting the largest yields per acre, the hay crop is mostly made up of alfalfa, and that the yield of this fodder plant is very much higher than that of the grasses chiefly cultivated in other States.

Buckwheat.—The reports as to the yield of this grain give a general average of 14.7 bushels per acre, as against 14.1 in 1892, and 15.3 in 1891. The general average, as to quality, is 92.4. New York and Pennsylvania, which comprise about two-thirds of the total area, have yields of 14.4 and 14.1 bushels, respectively, quality being 94 in each case. The States of heaviest yield are Maine and Vermont, whose averages are 29 and 29.2 bushels, respectively, while quality is reported at 99 for the former and 100 for the latter. In a considerable number of counties in the Middle and Western States, especially the latter, the crop was cut short by drouth, and in some localities in the Northwest it was overtaken by frost before it ripened.

Tobacco.—The consolidated returns from the tobacco-growing States make the estimated yield per acre 695.3 pounds, as against 682 pounds in 1892. The yield for both these years is below the average of the last decade, and with the slightly reduced acreage of the present season, the crop of 1893 will probably be about equal to that of last year. As has been the case in previous years, the yield per acre in the seed-leaf growing States is larger than in the States growing heavy tobaccoes. Thus Massachusetts reports 2,000 pounds, Connecticut 1,429, New York 905, Pennsylvania 1,000, and Wisconsin 889 pounds per acre, while in the other States the yield per acre ranges from 509 pounds in North Carolina to 884 pounds in Arkansas. Kentucky, the State of largest production, reports 705 pounds per acre.

Sorghum.—The estimated yield of sorghum per acre is generally lower than that reported during the last few years. The range is from 43 gallons per acre in Colorado to 120 gallons in South Dakota. The cause of the diminished yield is attributed to the widely prevailing drouth during the summer months, which was broken too late to allow the crop to recover from its low condition.

Fruit.—The season just ended has been a bad one for the production of most fruits, with the exception of grapes, which have yielded abundantly. The reports on condition of previous months went far in indicating this failure, and those of the present month, which give estimated yield as compared with an average year, substantiate them with remarkable uniformity. The proportionate yields in the several States can be best studied in the abstract of percentages given below.

Cotton.—The cotton returns of the Department of Agriculture for the month of November do not indicate a high rate of yield, but point, rather, to a diminished harvest as compared with that of 1892, which was less than any in the last decade. The causes of the light yield have been heretofore reported, viz. drouth, excessive moisture in some sections, the ravages of the insect enemies of the plant, and some other causes of a minor nature. Local estimates vary in range from one-fourth to three-fourths of a full crop. The weather throughout the entire cotton belt has been generally favorable to picking, and the Department is advised that owing to this fact a large part of the crop has been successfully secured, a considerable portion of which has been marketed.

The indicated yield, as averaged from the county estimates, apparent errors being eliminated, averages 148.8 pounds per acre, distributed by States as follows: Virginia, 152; North Carolina, 174; South Carolina, 142; Georgia, 136; Florida, 82; Alabama, 148; Mississippi, 143; Louisiana, 175; Texas, 151; Arkansas, 174; Tennessee, 138. As severe frosts have not yet been general, it is possible that the reported expectations may be exceeded.

The Yield Per Acre of the principle crops in 1893 is returned by the same authority as follows, corn being stated in bushels per acre of shelled corn; Irish potatoes, sweet potatoes and buckwheat in bushels per acre; sorghum in gallons per acre; while for grapes, apples and pears the figures show the product compared to 100 as representing an average crop:

SHOWING TABLE OF ESTIMATED YIELD PER ACRE OF CERTAIN CROPS, NOVEMBER 1, 1893.

States and Territories	*Corn.*	*Potatoes.*	*Potatoes.*	*Hay.*	*Buckwheat*	*Grapes.*	*Apples.*	*Pears.*
Maine	30.2	120	....	.92	29	101	35	82
New Hampshire	32.6	119	....	1.06	23	101	35	81
Vermont	32.4	111	....	1.11	29	82	60	63
Massachusetts	34.0	119	....	1.15	....	91	40	88
Rhode Island	24.4	108	....	.83	....	92	46	50
Connecticut	28.8	87	....	.99	15	87	50	63
New York	29.3	70	70	1.24	14	99	41	69
New Jersey	26.4	73	97	.99	14	102	64	69
Pennsylvania	24.9	76	79	1.03	14	94	55	71
Delaware	25.0	50	....	.50	20	100	60	75
Maryland	24.0	49	65	1.04	11	86	77	72
Virginia	19.0	84	109	1.11	13	79	79	74
North Carolina	12.6	97	104	1.70	11	90	67	74
South Carolina	7.7	83	91	1.57	....	87	67	77
Georgia	10.9	74	81	1.32	....	86	56	69
Florida	9.7	87	116	2.00	....	100	65	89
Alabama	11.7	83	87	1.52	....	72	55	61
Mississippi	13.3	81	82	1.65	....	70	56	68
Louisiana	14.7	67	76	1.62	....	83	67	68
Texas	18.0	53	64	1.04	....	78	58	75
Arkansas	16.0	88	93	1.17	....	70	59	60
Tennessee	21.0	68	83	1.39	12	65	64	46
West Virginia	21.9	80	83	1.10	11	82	40	43
Kentucky	23.8	68	79	1.33	....	70	30	43
Ohio	24.3	58	72	1.33	12	91	9	49
Michigan	23.7	75	....	1.46	13	101	35	63
Indiana	24.3	51	71	1.36	6	93	9	43
Illinois	25.5	53	70	1.21	11	86	10	41
Wisconsin	31.0	77	....	1.52	15	97	48	33
Minnesota	28.0	66	....	1.62	15	92	62	....
Iowa	35.4	58	60	1.58	13	101	30	40
Missouri	27.5	78	77	1.24	12	77	18	32
Kansas	20.3	44	84	1.31	9	70	19	26
Nebraska	25.0	44	54	1.25	14	73	35	46
South Dakota	25.2	54	....	1.42	....	73	73	....
North Dakota	20.8	69	....	1.29	....	....	....	....
Montana	27.5	138	....	1.26	....	....	....	....
Wyoming	....	134	....	1.35	....	....	....	....
Colorado	15.1	94	125	1.19	....	62	40	58
New Mexico	27.5	70	....	2.08	....	79	72	67
Arizona	17.8	75	....	1.75	....	75	50	50
Utah	27.4	88	....	1.72	....	91	67	74
Nevdaa	....	132	....	2.66	....	100	35	35
Idaho	....	153	....	2.45	....	96	97	98
Washington	23.1	120	....	1.58	....	85	74	77
Oregon	24.9	127	....	1.88	20	83	85	83
California	32.0	96	88	1.69	....	100	96	95
General aver'ge	22.6	72.2	....	1.32	14	....	....	....

Personal, Commercial and Agricultural.

Nearing Perfection.—In the growth and perfection of appliances which make railway traveling luxurious and comfortable, the people of the United States have noted with much pride the progress that has been made in recent years. We have been for many years much better off in this regard than have the people of Europe. In the old countries the tracks have been so much more solid and substantially built, that until recently we have been behind Europe in the speed at which trains could be moved over the rails. This state of affairs has, however, been remedied. The great four-track New York Central & Hudson River Railroad has been patiently spending enormous sums of money upon the improvement of its road-bed, till to-day, with steel rails of massive size and weight, bridges and culverts of steel and solid masonry, block signals, and tracks ballasted with broken stone, it can challenge any country in the world to compete with it. In point of fact, the traveler in America to-day, going west from New York via the New York Central, has his choice of Five Great Limited Trains, on each of which he may enjoy all the luxuries of a palatial home, or a completely equipped business office, and be whirled over the country at a rate of speed uniformly higher than is known anywhere else in the world, while at the same time he can keep thoroughly informed as to the state of the market and on all essential matters pertaining to his business. Truly we are a luxurious people.

Money in Potatoes.—There is more money in potatoes than in almost any other crop, provided they are properly managed. It has now been fully demonstrated that potato blight can be entirely prevented by properly spraying the vines with Bordeaux mixture through an effective spraying machine. The Red Jacket Potato Sprayer manufactured by the Field Force Pump Co., Lockport, N. Y., is one of the latest machines invented for this purpose, and has given perfect satisfaction wherever tried.

The Burlington.—This is the trade-mark of one of the best stable blankets made, and is generally known as the "Stay-on" on account of its exact fit. Those in want of a first-class horse blanket had better write to the Burlington Blanket Co., Burlington, Wis., for their catalogue, which will be sent free to all readers of the AMERICAN AGRICULTURIST.

The Farm Home Reading Circle.—A year ago, the faculty of the Michigan Agricultural College appointed a committee to prepare a course of reading especially adapted to the requirements of farmers, gardeners, fruit growers and stock breeders. The course was outlined and circulars issued. So many expressions of appreciation have been received, that the managers have been encouraged to carefully revise the course and take steps to widen its scope and increase its influence. The State Board of Agriculture have made provision for the printing, correspondence and postage connected with the course, so that the only expense to members is for books. The primary object is to promote agriculture and kindred pursuits. The circle offers a systematic course of reading. It furnishes books through the secretary at greatly reduced prices. It acts in a limited manner, as a bureau of information on agricultural subjects. All cannot enjoy a course at an agricultural college, but no one is so situated that he cannot cultivate habits of observation and study. The aim has been to supply a course which shall furnish practical information and assist those who desire to secure some knowledge of science as applied to agriculture. It is believed there are many who are ready to embrace the opportunities offered by by such a course. The course is not limited as to age or occupation. The Secretary, F. B. Mumford, Agriculturel College post office, Michigan, is to answer all requests for information. Five classes are offered: Soils and Crops, Live Stock, Garden and Orchard, Home Making, and Political Science. These classes were outlined by men prominent in their special lines, and, so far as it is possible are arranged progressively. It is urged that the course be taken up, as recommended, and finished. However, if for any reason books further along in the course are desired, they may be ordered and credit will be given for their completion. No requirement is made as to the order in which classes shall be taken up.

The World's Horticultural Society.—At the close of the World's Congress of Horticulture at Chicago, the World's Horticultural Society was organized, to promote correspondence and to facilitate exchange of plants and trees, and information between the countries of the world. This society can coördinate and extend the work of all horticultural societies, compile statistics, promote legislation and education, prepare correspondence directories, diffuse all the latest information from

(*Continued on Page* 716.)

Fall Planted Fruit Trees.—J. P. Grul, Hancock Co., O.: If the fruit trees planted this fall have stems five or six feet high, then each should be staked to prevent being moved about by the wind, and then to protect the roots bank up with soil. A small mound about the stems six to twelve inches high will be sufficient. Grapevines may be protected by throwing a few spades full of soil over the canes after laying them down. But the vines planted this fall will probably have very short canes; if not, cut them down at the time of planting, then bank up if you think they need any protection in the climate of Ohio.

World's Fair Trophies.

THE McCORMICK HARVESTING MACHINE COMPANY AWARDED SEVEN MEDALS AND DIPLOMAS FOR THE SUPERIOR EXCELLENCE OF THEIR BINDERS AND MOWERS.

At the World's Fair on Oct. 24th, seven medals and seven diplomas were awarded the McCormick Harvesting Machine Company of Chicago. These honors are in recognition of the merit of the following named machines manufactured by the McCormick company: The Machine of Steel, Bindlochine, Open Elevator, McCormick Simple Knotter, No. 4 Steel Mower, Big 4 Steel Mower and the Corn Harvester. These, the highest awards, are based on the performance of the McCormick machines before the judges in the field, at the regular field trials of the Exposition, held at Wayne, Illinois, in July last, the machines tested being those regularly built for the general trade. It is a significant fact that of all the manufacturers of Harvesting machinery having exhibits at the World's Fair, the McCormick company alone complied with the committee's request to show the capabilities of their machines in the field. The first successful reaper was invented by Cyrus Hall McCormick in 1831, and from that time to this the McCormick machines have had a decided prestige over all others. They have won the grand gold medals and highest awards at every World's Fair, and it was possibly for this reason that sixteen different manufacturers of binders and mowers did not compete in the field with them. Throughout the entire season these sixteen concerns, in their efforts to have a floor award granted, did everything possible to baffle the commission and prevent a fair open field exhibit that should test the working qualities of the machines. And, after a four months' fight by the makers of harvesting machines, who did not dare meet McCormick in the field—a fight in which the United States Commission voted at every turn that the only way to examine a machine was by seeing it at work in the field—and having signed an agreement with all the others not to show in the field, one concern wanted an award so badly that only a few days before the close of the Fair it went so far as to get a secret permit to pay the expenses of a new committee to secretly accompany their special machines to a remote section of Colorado, where no other machines could be shown, and where the crop (if any were left) must have been much lighter, and the surface of the ground firmer, with the evident hope that these conditions would insure as easy work and as light draft as were shown by the regular McCormick machines in the official test in July, in the very heavy grain then harvested. The diplomas awarded the McCormick machines speak in highest terms of their efficiency, ease of handling and extreme light draft. The McCormick No. 4 Mower showed wonderful power at work, and a 5ft. cut machine, in a field averaging three tons to the acre, with a dynamometer perfectly adjusted by the United States custodian of government weights and measures, drew at work, at an average draft of 125 pounds. The judges pronounce this a remarkable performance. The McCormick binders cutting 6 feet of heavy oats on uphill ground, and carrying bundle carriers, measured by the same standardized dynamometer, showed a draft as low as 320 pounds, and none higher than 360 pounds. This wonderful showing was a great revelation to many distinguished foreigners at the trial, and no one present was at a loss to know why more machines did not take part in the tests.

California.
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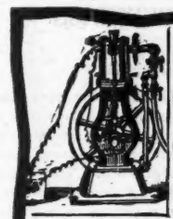

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MATTERS OF BUSINESS.

(*Continued from Page* 714.)

the various parts of the globe, consider means of transportation, and facilitate the exchange of varieties and every commodity in which pomologists, viticulturists, florists, vegetable gardeners and other horticulturists are interested. The president is Prosper J. Berckmans, of Augusta, Georgia, a native of Belgium, but for many years a prominent pomologist and nurseryman of the United States, being now the president of the American Pomological Society. The vice-president is Henri S. de Vilmorin, of Paris, France, a distinguished horticulturist, scientist and author, who is favorably known throughout the world. The first secretary-treasurer was George Nicholson, curator of the Royal Gardens at Kew, England, everywhere known as the author of the incomparable Illustrated Dictionary of Gardening, but finding the office inconsistent with his present duties, he has resigned. The vice-president for the United States is William F. Dreer, of Philadelphia, a man long and favorably known in the seed trade. The secretary-treasurer for the United States is Professor L. H. Bailey, of Cornell University, Ithaca, New York, whose original work in horticulture has already made him a world-wide fame. At present he is also the acting secretary-treasurer for the world. The initial membership fee for North America is $2, which also covers the dues for the remainder of the current year. Thereafter the dues are $1 per year. Every American horticulturist should identify himself with this organization, and every State or district society should do the same. The membership fee for societies is $5. Remittances from the United States should be sent to the secretary-treasurer at Itaca, New York.

A Salary, with expenses paid, will come handy to anyone who is now out of employment, especially where no previous experience is required to get the position. If you want a position, read advertisement on Page 715, headed "A Chance to Make Money."

Change of Ownership.—The patent right of the improved Eureka Sap Spout, formerly owned by C. C. Post, Burlington, Vt., has been transferred to Charles C. Steele, 81 Fifth Avenue, Brooklyn, N. Y., to whom all orders and communications should be addressed. These spouts have easily taken the place of the old-style wooden ones, and are now considered indispensable to successful maple sugar making.

Butter Makers' Association.—The leading butter makers of the Atlantic States recently held a convention at Springfield, Mass., and organized the Eastern Butter Makers' and Cheese Makers' Association, electing a full corps of officers, with representatives from each of the Northern Atlantic States. The secretary is Charles M. Bull of Springfield, Mass. The elected officers will act as an executive committee. It is intended to hold a convention at some central location to show the strength and purposes of the association, with addresses by the leaders of these industries, and possibly an exhibit of butter and cheese, together with machinery for their manufacture. Butter and cheese makers in the Atlantic States are urged to join and give their aid and influence.

Money in Pigs.—We desire to draw the attention of our readers to the advertisement of the L. B. Silver Co., Cleveland, Ohio, whose O. I. C. Hogs have become famous among swine breeders. They offer a pair of pigs on time and agency to the first applicant. Catalogues are mailed free to readers of the AMERICAN AGRICULTURIST.

Columbian Awards.—The Foos Mfg. Co., Springfield, O., were awarded three first medals at the World's Columbian Exposition at Chicago, on Crushing Mills, Attrition Mills and Safety Device, the latter applying especially to Feed Mills. We congratulate the Foos Mfg. Co. on their success, which they are justly entitled to.

Cut Bone for Poultry.—The feeding of ground or cut butchers' offal to fowls is becoming very popular, and deservedly so, because this form of animal food cheaply replaces the insects and worms which form so large a part of the natural food of poultry. A raw bone, and even a cooked one, contains much digestible animal matter, as may be proved by removing the lime with acids. As trimmed by the butcher, they also have much meat and gristle adhering to them. F. W. Mann & Co., of Milford, Mass., make a bone cutter, which changes the bones and offal into a soft mass which is easily eaten. This is fed every two or three days, at the rate of one pound for twenty hens. It may also be mixed with ground grain or bran and with green food cut fine. Some use it as a food for hogs. The nitrogenous food in bones is too valuable to be wasted in the fire or in the garbage heap.

Baling Cotton for Exports.—Improperly baled cotton, carelessly stored by the commission merchant, who probably allows it to become wet, and thus increases the freight charges on the damaged staple, will certainly injure the European market for American cotton, and this will sooner or later be seriously felt by the home planters. The conscientious planter who carefully assorts and bales the cotton will, in the end, be properly rewarded, but the careless planter who mixes bad and good together will only be able to sell at very low prices, even when there are poor crops. Indian and Egyptian cotton before being shipped to Europe, is rebaled by steam compressors, and so well covered with jute as to withstand almost any storm. The bales are then fastened with at least two more wires or hoops than are used on the American bales. Thus protected, the cotton reaches the factory in good condition and commands a good price.

Force Pumps and Hay Carriers.—F. E. Myers & Bro., Ashland, O., received World's Fair Medals and Awards for Farm Force Pumps, Hay Carriers, a new and novel combination, Hay Carrier Tracks, Cyclone Tank Pumps, Spray Pumps, general display of novel and artistic device for showing goods. Send for their catalogue and colored lithograph, showing why the Indian ocean is our antipodes, instead of China.

Worlds' Sheep Farming for Fifty Years.—This little book contains 104 pages and is embellished with 124 fine half-tone engravings. It is a comprehensive review of the sheep farming of the world for the last half century; carefully prepared by the highest authorities in each country. It should find its way into the library of every shepherd in America. The book is not for sale, but can be secured as long as the limited edition lasts by enclosing ten cents in stamps to the Cooper Sheep Dip Depot, 178 Michigan street, Chicago.

1,200 H. P. Turbine for Niagara.—Another immense water wheel has just been shipped to Niagara Falls by James Leffel & Co., of Springfield, Ohio. The wheel is of the new type on horizontal shaft, and will connect direct to the powerful wood grinding machinery, obviating entirely the use of gears or belts. The machines will be located on each side of the wheel, affording a very simple design and arrangement for the whole plant. The Leffel Wheels already in operation there give so uniform and perfect satisfaction as to induce the parties to make the duplicate orders recently shipped.

Mason & Hamlin Victorious at Chicago.—The official report of the World's Fair awards states that Mason & Hamlin of Boston, Mass. have taken highest honors on both pianos and organs.

National Swine Breeders' Association.—The meeting of the National Swine Breeders' Association called to meet at the World's Columbian Exposition, October 13, was not held because the Executive Committee deemed it unwise to do so with such small attendance. There was every reason to believe that this meeting would be very largely attended, but swine exhibitors were required by the Exposition authorities to remove before the date fixed for the limit of this exhibition, so that many breeders were compelled to go with their hogs before the day fixed for the meeting of this Association, while the remainder were on that date necessarily engaged in shipping their stock. The failure to hold this meeting is to be regretted because there are matters of interest to the swine industry that should have attention, and through no other source can these be accomplished as well as this organization. The Executive Committee will appoint a date for another meeting as soon as convenient time can be decided upon. By the payment of $1.00 to Jno. G. Spring, Secretary, Springfield, Ill., for membership fee, new members will receive the proceedings of the Associations for five preceding years.

The College and Station Association.

The seventh annual convention of the Association of American Agricultural Colleges and Experiment Stations was held this year in Chicago, and, like so many other national organizations, the date was fixed to accord with the related Congresses. A very brief programme was prepared, so the delegates might be free to attend the branch agricultural congresses in which most were interested, and the fact was also recognized that the attractions of the Exposition were too great to compete with by long sessions listening to scientific papers.

Besides two business meetings on the 17th and 18th of October, the principal session was that of Tuesday evening, when a few notable addresses were made. The president of the association for the past year has been Prof. W. A. Henry, of Wisconsin, and this is the first time a station director has occupied the office. It was, therefore, natural and proper that the annual presidential address should be devoted to station matters. President Henry took very pronounced ground against station workers having any considerable amount of duty to perform as instructors at fixed hours. He believed good work by the stations, thorough, scientific research, to be more important than any college work, indeed, the very basis of sound instruction, and he argued, therefore, that the stations should have the services of the best men, with as little college mortgage on their time as possible. He also reviewed the work of American stations, made some healthy criticisms, gave some good advice for future guidance, and maintained that, as a whole, the quantity and quality of the what has already been accomplished is as good as could be expected, under all the circumstances.

This address was followed by one from Sir Henry Gilbert, who came as special delegate from the Lawes Agricultural Trust of England, on this the jubilee year of Rothamsted. His discourse was introductory and descriptive of a course of lectures which he is commissioned by the Trust to deliver in this country during his present visit, and which will review and summarize the famous experimental work of Lawes and Gilbert during the fifty years just closed. This course of lectures are to be delivered at the Massachusetts Agricultural College during the month of November. President Fairchild, of the Kansas College, spoke briefly, but in a thoughtful and scholarly manner, upon intellectual development in connection with agricultural teaching.

The Sections of the Association on College Work, on Botany and Horticulture and on the Mechanic Arts held brief meetings, devoted to business and technical discussions. The general business sessions were mainly occupied by reports from the committees on the collective college and station exhibit at the Exposition and on the test of dairy breeds, with the questions arising therefrom.

The Association elected officers for the ensuing year as follows: President, Gen. Stephen D. Lee, of Mississippi; Vice-Presidents, Professor Morrow, of Illinois, President Canfield, of Nebraska, Director Newman, of South Carolina; President Hadley, of New Mexico, and Vice-Director Frear, of Pennsylvania; Secretary Treasurer, Director Scovell, of Kentucky; Bibliographer, Director Johnson, of Connecticut; Executive Committee, Major Alvord, of Virginia (chairman), President and Director Goodell, of Massachusetts; President White, of Georgia; President Harris, of Maine, and the president, last president and secretary of the association.

This meeting was not numerously attended, but delegates were present from forty-one States and Territories, and this was regarded as very satisfactory all considered. The association seems to be strong and active and as determined as ever to guard the trusts committed to the institutions comprising its membership, and to steadily raise the standard of work accomplished.

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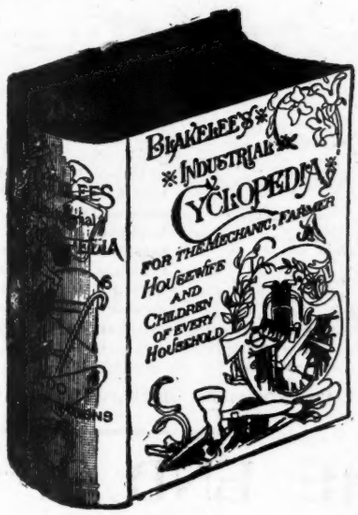

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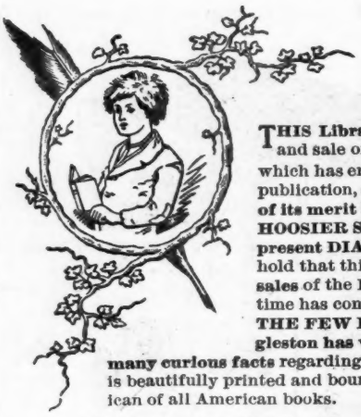

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Christmas Number

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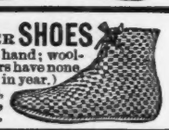

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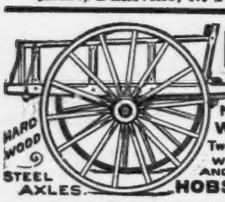

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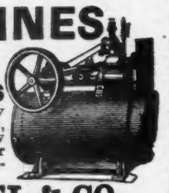

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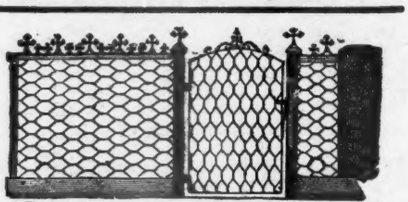

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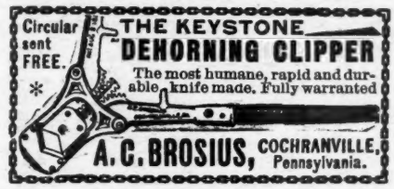
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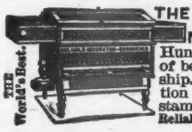

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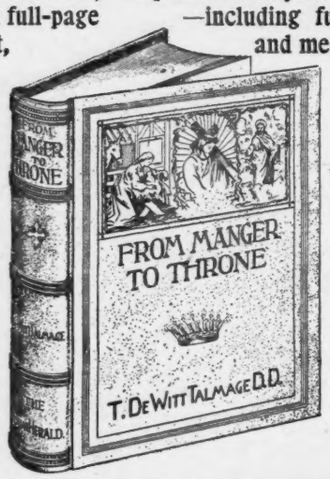

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